Rocky Flats Environmental Technology Site

RECONNAISSANCE-LEVEL CHARACTERIZATION REPORT (RLCR)

GROUP A FACILITIES

REVISION 2

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ABBREVIATIONS/ACRONYMS

ACM	asbestos-containing material
ASD	Analytical Services Division
Be	beryllium
CHWA	Colorado Hazardous Waste Act
CBDPP	Chronic Beryllium Disease Prevention Program
D&D	decontamination and Decommissioning
DDCP	Decontamination and Decommissioning Characterization Protocol
DOE	U.S. Department of Energy
dpm	disintegrations per minute
DQOs	data quality objectives
EPA	U.S. Environmental Protection Agency
ITS	Interceptor Trench System
K-H	Kaiser-Hill
LDR	Land Disposal Restrictions
LBP	lead-based paint
LCS	laboratory control samples
LLW	low-level waste
LSDW	life safety disaster warning
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDA	minimum detectable activity
MDC	minimum detectable concentration
OSHA	Occupational Safety and Health Administration
Pb	lead
PCB	polychlorinated biphenyls
RCRA	Resource Conservation and Recovery Act
RDL	required detection limit
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RLC	reconnaissance level characterization
RLCP	Reconnaissance Level Characterization Plan
RPD	relative percent difference
SVOC	semi-volatile organic compound
TCLP	Toxicity Characteristic Leaching Procedure
TSI	thermal system insulation
TRU	transuranic
TSCA	Toxic Substances Control Act
VOC	volatile organic compound

EXECUTIVE SUMMARY

A Reconnaissance Level Characterization (RLC) was performed to assess physical, chemical and radiological hazards associated with Group A Facilities (i.e., Buildings 551, 662, and 910; Tents 10 and 11; and the 709 Cooling Tower). Hazards were assessed based on a review of historical and process knowledge, historical radiological and chemical data, and newly acquired RLC data. Results indicate the presence of some radioactive contamination and asbestos but no other significant chemical or physical hazards. Some beryllium contamination was also detected in the Tent 10 Permacon. In addition, drum repack operations are currently underway in the Tent 11 Permacon, hazardous liquids are periodically conveyed through a waste transfer line that goes through Building 910, and some Building 910 systems could contain contamination from past operations. Contaminated areas, hazards and facility classifications based on contamination and hazards are summarized in Table ES-1.

Even though no surface chemical contamination was identified in any of the buildings (except for some beryllium contamination in the Tent 10 Permacon), slabs/floors associated with the Building 551 chemical dispensary, Building 662, Building 910, and Tents 10 and 11 on the 904 Pad may contain residual contamination from historical spills and releases. For example, the 904 Pad may contain residual chemical contamination (RCRA-listed spent solvents and electroplating wastes containing heavy metals) from the release of pondcrete and saltcrete that occurred on the pad prior to the tents being erected. Also, the Building 662 pad was previously used to store a variety of wastes, and historical spills/releases are documented. Therefore, it is recommended that the slab/floor media associated with these structures be sampled and analyzed during future characterizations (e.g., in-process and/or environmental restoration). .

Based on these findings, all Group A facilities are considered Type 2 facilities.

The demolition of Group A facilities will generate primarily sanitary wastes. The Site will be able to recycle some waste materials, such as structural metal. A small amount will have to be disposed off-site as low-level radioactive or chemical (i.e., RCRA- and asbestos containing-) waste.

Table ES-1 Summary of Hazards and/or Contamination Indicated by the RLC

Bldg/ Facility	Chemical Contamination Indicated?	Contamination Type	Location	Radiological Contamination Indicated?	Contamination Type	Location	Building Classification[1]
551	Yes	Asbestos	South roof and flashing w/in black tar	Yes	Total (Fixed) Alpha	Roof and roof drains	Type 2
662	No	None	NA[2]	Yes	Total (Fixed) Alpha	Roof perimeter and west-central side of floor	Type 2
709	Yes	Asbestos	Thermal systems insulation (TSI) piping adjacent to Bldg 799	Yes	U233/234, U235, U238	Sediment in sump	Type 2
910	Yes	Asbestos RCRA Constituents	TSI piping associated w/ heating system & waste line Process systems and waste lines	No	U234, U235, U238	Process equipment and piping	Type 2
904 Pad Tent 10	Yes	Beryllium	Permacon floor	Yes	Total (Fixed) Alpha	Permacon floor	Type 2
904 Pad Tent 11	No	None	NA	No	None	NA	Type 2 Based on current operations

[1]Building classification does not consider environmental media or bulk media beneath the immediate surface of the floors.

[2]NA = Not Applicable

Radiological Engineering recommends surveys where significant configuration changes are implemented in the building prior to demolition due to unknowns associated w/ movement of bulk material or equipment.

Type 1 facilities are considered "free of contamination," and Type 2 facilities contain some radiological or hazardous substance contamination.

The presence of asbestos does not make a facility a Type 2 as long as asbestos is removed pursuant to Site asbestos abatement procedures.

1.0 INTRODUCTION

As part of the Rocky Flats Environmental Technology Site (RFETS) Closure Project, numerous buildings and structures will be removed. Among these is a group referred to as the Group A Facilities, which include Buildings 551, 662, and 910; Tents 10 and 11; and the 709 Cooling Tower. Tents 10 and 11 are located on the east side of the 904 Pad, which is located in the southeastern part of the Industrial Area. Building 551 is located in the central part of the Industrial Area on Central Avenue, Building 662 is located north of Building 850, and Building 910 is located in the northeastern part of the Industrial Area. The 709 Cooling Tower is located southeast of Building 707. The locations of these facilities are shown on following site plan.

Before the facilities can be removed, hazards must be identified, and the facility classifications must be confirmed. Hazards identified will be used to plan the decommissioning and demolition work, including addressing worker health and safety and waste management issues. This document presents the existing physical, radiological and chemical hazards associated with the eight facilities, and classifies the facilities pursuant to the RFETS Decommissioning Program Plan (DPP, K-H, 1998a). The hazards assessment is based on facility/process knowledge, operating and spill records, and results of the reconnaissance level characterization (RLC) conducted. The document also presents estimated decommissioning waste types and volumes. The RLC was conducted pursuant to the RFETS Decontamination and Decommissioning Characterization Protocol (DDCP). The content and general outline of this report is consistent with Kaiser-Hill (K-H) guidance on composition of decontamination and decommissioning (D&D) documentation (FDPM, K-H, 1998b).

1.1 Purpose

The purpose of this report is to communicate and document the results of the RLC effort. The purpose includes both summarizing the data into concise, usable formats and interpreting the data for use in management decisions, primarily:

- definition of individual hazards and overall risk associated with facility D&D and managing resulting wastes;
- preliminary waste classification based on RLC results; and
- classification of buildings based on hazards identified.

Characterization of facilities is necessary as a prelude to job hazard analyses associated with worker health and safety in the field and to ensure compliance with waste regulations.

1.2 Scope

This report covers physical, radiological and chemical characterization of the six Group A facilities. Chemical characterization was conducted using Colorado hazardous waste management regulations as a means to segregate materials as either hazardous or

non-hazardous waste. Environmental media beneath and surrounding the facilities are not within this scope.

2.0 OPERATING HISTORY AND PHYSICAL DESCRIPTION

2.1 Building 551

Building 551 consists of two main sections, the original south section and a north addition. The south section is constructed of concrete block, and structural framing consists of concrete columns and beams. The floor is a concrete slab, and the roof deck is concrete. The dimensions are 122'x180'x25' high. Insulated boards and 4" steel strips (to hold boards in place) have been installed to replace windows. However, there are some small windows in the southwest corner. The north addition is sheet metal (both the walls and roof) and the floor is a concrete slab. The dimensions are 90'x202'x25' high. The roof is a gable, standing-seam metal roof with ridge vents and roof exhausters. The structural framing consists of steel columns and trusses. The walls and the roof are insulated, and the inside exterior walls have flat metal panels. Another addition is on the east side of the original building, constructed of concrete block. The dimensions are 45'x65'x20' high, and the structural framing consists of steel columns and beams. The original building and the east-side addition have built-up roofs. The building is heated by steam unit heaters, and includes ventilation, steam/condensate piping, a fire protection system, water, electrical, and gas. There are several docks with roll-up doors (electrical/chain-driven). Several electrical hoist systems are also present. The east wing of the south side has a door with a wooden platform and stairs on the outside. The northeast corner of the building has a door with exterior concrete steps and metal railing. All concrete foundations are approximately 4' above grade, and all floor elevations are the same.

Door 10 on the west side of the building leads to T551A, an office trailer housing non-RFCSS personnel. A wooden structure joins the two buildings. Also on the west side of the building, to the north of T551A, is a large metal platform/catwalk on which cargo containers are located. This structure is connected to B551 via a metal ramp. In addition, railroad tracks are located on the west side of B551. Outside on the east side there is a transformer in a concrete pad. The transformer is labeled as PCB contaminated.

The building is still used as a warehouse. The south side was constructed in the 1950's, and the north addition was constructed in the 1960's. The north side includes a fabrication and service shop, and an area used for mock-up testing and training (e.g., clean gloveboxes and piping used to simulate liquid stabilization processes and activities to be performed in B371). The main building entry is at the south side. There are offices, men/women restrooms, and a mezzanine area above the offices. The south side also includes a chemical dispensary and a flammable storage room. There are large storage racks bolted to the floor. The south side racks are protected from forklifts by L-shaped steel rails bolted to the floor. The north side includes a large, metal equipment/tool crib/cage. There have been chemical product spills in the flammable storage room, but they have been cleaned up by the Fire Department Hazardous Materials Team. This room has an exterior door, a wall vent, and a roof vent.

Building 551 has no radiological postings on the interior or exterior of the building. There are also no routine historical or special radiological surveys (total and/or removable) available for the interior and exterior of Building 551. There are no radioactive sources in the radioactive source registry for Building 551. The building is designated as an "exempt building" per HSP 18.02, and therefore, contents may be free-released without surveys. However, the north side of the building had been previously radiologically contaminated (see Historical Release Report, PAC Reference No. 500-158), although past contamination reportedly has been cleaned up.

2.2 Building 662

Building 662 is an unpainted, galvanized, corrugated sheet-metal structure on a concrete slab. Its dimensions are 40'x 65'x 15' (eave height). The roof has a gable design, approximately 6' higher at the ridge, with a single roof exhauster in the ridge. The structural system consists of steel trusses supported by welded back-to-back steel channel columns. The building is insulated in the ceiling and walls. The building has five exterior doors, three man doors and two sliding doors. The main doors are located at the northeast corner, the southeast corner, and the middle of the south wall. The two sliding doors are located in the middle of the north wall and in the middle of the south door. The north door is inactive. There is a painted, corrugated metal vestibule for the northeast door, on concrete with a single window and storm-door entry. There is a wooden lean-to at the southeast door. Three windows are located on the east walls. The north exterior wall has a mercury-vapor light.

The building possesses sheet-rock ceiling and wallboard panels in various locations, as well as exposed fiberglass and foam insulation. The wallboard material is fastened to the building girts. There is a restroom with a shower and a hot water heater overhead, two hard-wall offices, and a small testing chamber. One office has vinyl paneling. The concrete pad is covered with 12"x12" vinyl tile. There is one floor drain filled with concrete. The building is cooled with two wall air conditioners, and heated with five ceiling-hung electrical unit heaters and two baseboard units, one located in the office and the other in the restroom. There are wall exhausters in the east and west walls. The building has a water line, fluorescent lighting (~25), and lots of electrical conduit. The south wall contains a lockout/tagout panel, three alarm panels, 9 electrical disconnect boxes, 3 light panels, and a transformer. The east wall has one disconnect box.

The original building slab contained a wooden structure, and after the structure was removed (prior to 1954), the slab was used for outdoor staging and storage of radioactive, hazardous and mixed waste containers. During the late 1950s and early 1960s container leaks and spills occurred on the pad, resulting in contamination of the pad. The building also was used in the past for beryllium storage. Another concrete layer may have been poured on the original pad.

The current structure was erected in the mid 1960s. The building is currently used by plant power personnel for testing and maintenance of electrical equipment, and for related small parts storage. No radiological material or hazardous chemicals are

currently stored or used in the building. PCB equipment has never been repaired, maintained or tested within the building. Mercury vapor lights are repaired, maintained and tested within the building, but no known reportable releases of hazardous substances have occurred within the building. There are also no routine historical or special radiological surveys (total and/or removable) available for the interior and exterior of Building 662. There are no radiological postings on the structure.

2.3 709 Cooling Tower

The 709 cooling tower is a wooden structure, square in shape, consisting of a concrete basin, a redwood superstructure, an interior lattice of wood lathe, cooling water pumps, a chemical addition shed located on the west side, and a valve vault for configuring the cooling water return. The building structure is condemned and no entry to the top is permitted. The wooden steps attached to the cooling tower structure are barricaded to deny access to the top of the tower. The concrete basin is approximately 40'x 50'x 3' thick, and approximately 6" thick. The wooden structure sits within the basin and is approximately 35 feet high. The cooling tower has two cells, which have separate fan motors and gearboxes for each fan. The gearboxes are located directly beneath the fan blades and are below the top deck and have poor access. The fans are located on the top deck and are surrounded by shrouds. The lower exterior portion, on the north and south sides, consist of 3 sheet-metal slats approximately 3' wide. Approximately 17 lamps surround the perimeter of the top of the tower and the access stairs to the top deck. The top deck of the cooling tower also houses the return water distribution manifolds and two security post fighting positions. The west side of the structure contains a metal ladder to the platform. The pumps and a generator are located on a steel platform west of structure. Also, electrical systems, a hoist system, and the shed (sheet metal approximately 5'x8'x7') are located on west side. The raw water line comes in from the south side. The north side contains cooling water lines (14") and fire water lines. Valve pits are located on the north and south sides of structure.

This structure was built in 1969 to service Building 707 cooling water requirements. It has been out of service since 1988 or 1989. Cooling Tower 709 poses a fire hazard. There are no radiological postings on the structure. There are also no routine historical or special radiological surveys (total and/or removable) available for the interior and exterior of the cooling tower.

2.4 Building 910

Building 910 is a two level structure. The upper level consists of a large process room, an office, an electrical room, and a smaller process room. The lower level consists of one large, open area. The upper level walls are constructed of 12" concrete block, and the lower level is constructed of 12" thick concrete. The building dimensions are 47'x102'. The first floor walls are 14' high, at top of masonry on the north side, and 12' high, at top of masonry on the south side. Four feet of the lower level walls are above grade, and 15 feet of wall are below grade. The building is on a pier system, ranging from 15' to 28' deep, and there are three 24"square concrete columns on the lower level, at mid-span of the building. Both floors have poured concrete slabs. The building

concrete block walls are reinforced vertically and horizontally. The roof system consists of twin tees, 8' wide x 20"deep, bearing on top of the concrete block walls at each end. The roof cover is built-up with over 1" thick rigid insulation board on top of 2" perlite. The perlite is on top of the concrete twin tees. The top of the roof is covered with tar and pea gravel. Metal flashing is located at the top of the walls. Inside of the building are 6" concrete block partitions, approximately 120 linear feet, and there is an access floor hatch in the first floor. Metal steps also lead to the first level. There are three man doors and one roll-up door in the exterior walls of the building. There are also exhaust fans and louvers in the exterior walls, and conduit and lighting on the exterior walls.

There are related outdoor systems. On the west side there are three natural-gas-fired electrical generators on a concrete pad and related gas systems. On the north side, there is an off-specification distillate line to the solar pond(s), an evaporator feed line from the pond(s), three self-contained metal cooling towers on a concrete pad, electrical systems, an emergency shower, a chemical storage tank (800 gal., labeled asbestos-free) on a concrete/steel cradle in concrete secondary containment, and truck overhead dispensing pad/system with concrete secondary containment. On the east side, there is a metal door and a concrete platform with concrete stairs and metal railing, a transformer platform, a concrete pit, an empty nitric acid storage tank on a concrete/steel cradle in concrete secondary containment, and an empty concrete sludge drying bed. On the south side there are concrete steps to a metal door and a concrete platform/loading dock with a roll-down door, and 4" pipes entering building.

Building 910 was constructed in 1977 to process liquids from the solar evaporation ponds and waters collected from the Interceptor Trench System (ITS). However, the facility was considered too expensive to operate, and systems leaked. Therefore, the treatment systems were shutdown in 1993. Prior to this date, the reverse osmosis system in the basement treated effluent from the sanitary treatment plant, and the evaporator system in Rm101 treated approximately 300,000 gal. of ITS water. Liquids from the Solar Ponds were never treated in the facility. The building currently has equipment on both levels (i.e., treatment systems, tanks, process control panels, instrumentation, large quantities of piping and conduit, etc.). Treatment systems and tanks have been emptied but were not drained 100%. There is also a 20-foot section of a waste transfer line in the basement that periodically conveys Solar Pond and ITS waters to the Building 374 Treatment Facility. The lower level has floor drains. In addition, the building has a fire protection system and lighting, and is connected to the Site Life Safety Disaster Warning (LSDW) system.

Building 910 has no radiological postings on the interior or exterior of the building. There are no routine historical or special radiological surveys (total and/or removable) available for the interior or exterior of Building 910. There are no radioactive sources in the radioactive source registry for Building 910.

2.5 Tents 10 and 11

Tents 10 and 11 are constructed on an asphalt pad, sloped to drain with a 6-12 inch berm around the pad to collect potential spills. The pad is referred to as the 904 pad, and it has two other tents constructed on it. The tents were constructed in January 1990 for the controlled storage of low-level mixed waste, hazardous waste, and for waste inspection, sampling and repackaging activities. The open pad area and the tents were used for the controlled storage of pondcrete and saltcrete, and a lesser amount of process-generated waste, containing a wide variety of radioactive and other hazardous contaminants. Pondcrete and saltcrete are, respectively, sediments from the solar evaporation ponds and the Building 374 evaporator, which have been mixed with cement to create a solid waste form. The structures consist of ground-anchored, steel-arched, rigid-frame members, with tension prevention bars, that spans the width of the arch, attached underneath, about at the shoulders of the arch. The bars have turnbuckles in the center of their spans, and they screw into anchors at each end. The anchors are attached to the rigid frame members bottom webs. The tents enclosure are weatherproof fabric membrane panels, that spans from frame to frame. The membrane panels are attached at each rigid frame, and on top of the panels are cables that spans from frame to frame for additional hold down. There are man doors in the side walls of the tents, and large 10' wide, vehicle accessways. Tents #10 and 11 have overhead heat, lighting, plant LSDW system, and wind turbine ventilators.

Tent 10 is 60' wide x 362' long x 21' high, and is used to package waste crates and to store investigation derived waste (primarily soil). It also contains a sheet-metal Permacon unit used to treat waste. The unit is a Radioactive Work Permit area. There is a groundwater well casing situated in the middle of the tent (#1087). The tent includes a great deal of equipment and supplies and electrical panels. The Permacon is equipped with an external HEPA system, and includes external metal berming. Tent 11 is 60' wide x 334' long x 21' high, and is used to store various wastes. It also includes a Permacon unit, similar to the unit in Tent 10, which is used to repack waste chemicals. The interiors of Tents 10 and 11 are radiologically posted as "Radioactive Material Areas", as well as the exterior areas around the tents. An area within Tent 10 is radiologically posted as a "Contamination Area, as is the Tent 11 Permacon unit". Routine radiological surveys are available for both tents.

3.0 SUMMARY OF CHARACTERIZATION ACTIVITIES

3.1 Data Quality Objectives (DQOs)

The Problem

Several contaminants are suspected within the Group A buildings, but the quantities of contaminated media and contaminant concentrations are unknown relative to the requirements associated with the D&D program. Determination of the types and quantities of radiological and chemical contamination, and the associated consequent waste streams, are required for successful implementation of the project DQOs. Based upon historical process knowledge of the Group A buildings, the potential contaminants of concern are: radionuclides, RCRA metals (specifically chromium and lead), beryllium, asbestos, and polychlorinated biphenyls (PCBs).

The Decisions

The critical technical decisions for the project were as follows:

- What floors, walls, ceilings, materials, media, and/or equipment are radiologically and/or chemically contaminated?
- What are the radiological and chemical waste streams that will result from D&D, and what are the associated volumes?

Inputs to the Decisions

Inputs are quantitative data produced from the radiological survey of surfaces for removable and total contamination as well as the analysis of cooling tower wood and basin sediment samples, and paint and surface smear samples for radiological and chemical contamination. Historical data and process knowledge were also reviewed for use. In addition, applicable action levels, unrestricted release criteria, transportation requirements, waste management regulations, pollution prevention/ waste minimization criteria, ALARA and waste acceptance criteria (WAC) were used.

Decision Boundaries

Buildings and all materials and equipment contained therein were considered as within the project boundaries. Environmental media were not considered within the project boundaries.

Decision Rules

Radiological decision rules are listed below. Decision rules for chemicals are listed for hazardous waste constituents, beryllium, PCBs and asbestos. Radiological and chemical decision rules are based on the premise that the Reconnaissance Level Characterization is an initial characterization for waste management purposes.

Radionuclides

1. If all radiological survey and scan measurements are below the surface contamination guidelines provided in DOE Order 5400.5, and if soil and sediment concentrations in the B709 cooling tower basin are within background concentrations for volume contamination presented in RFETS Radiological Safety Practices 09.03 (Unrestricted Release of Bulk and Volume Material), the area is classified as not radiologically contaminated.

2. If any radiological survey and scan measurement exceeds the surface contamination guidelines provided in DOE Order 5400.5, and/or if any soil and sediment concentration exceeds background concentrations for volume contamination presented in RFETS Radiological Safety Practices 09.03 (Unrestricted Release of Bulk and Volume Material), the area is classified as radiologically contaminated.

3. If all radiological sample measurements are below the volume contamination thresholds provided in the No-Rad-Added (NRA) Verification Program (refer to Kaiser-Hill letter to DOE, RFFO, Application of Surface Contamination Guidelines from Department of Energy Order 5400.5 – WAH-064-98, March 10, 1998), the building, area and/or volume are considered not radiologically contaminated.

4. If any radiological sample measurement is above the volume contamination threshold provided in the No-Rad-Added (NRA) Verification Program, the building, area and/or volume are considered radiologically contaminated.

RCRA Constituents

If decommissioning waste is mixed with or contains a listed hazardous waste, or if the waste exhibits a characteristic of a hazardous waste, then the waste is considered RCRA-regulated hazardous waste in accordance with 6 CCR 1007-3, Parts 261 and 268.

CERCLA Hazardous Substances

If material contains a listed hazardous substance above the CERCLA reportable quantity (40 CFR 302.4), the material is subject to CERCLA regulation (i.e., remediation and/or notification requirements).

Beryllium

If surface concentrations of beryllium are equal to or greater than 0.2 ug/100 cm^2, the material is considered beryllium contaminated per the Occupational Safety and Industrial Hygiene Program Manual, Chapter 28, Chronic Beryllium Disease Prevention Program.

PCBs

If material contains PCBs from the manufacturing process, the material is classified as PCB Bulk Product Waste and subject to the requirements of 40 CFR 761.

If PCB contamination from a past spill/release is suspected, or if a PCB spill is discovered that has not been cleaned up, the associated material is classified as PCB Remediation Waste and subject to the requirements of 40 CFR 761, the RFETS Polychlorinated Biphenyls Management Plan (PRO-673-EWQA-1.5), and the RFETS WSRIC standards.

If a waste or item contains PCBs in regulated concentrations, the waste or item is classified as PCB-regulated material and subject to the requirements of 40 CFR 761.

Asbestos

In accordance with 40 CFR 763 and 5 CCR 1001-10, if any one sample of a sample set representing a homogeneous medium results in a positive detection (i.e., >1% by volume), then the material is considered asbestos containing material (ACM).

Tolerable Limits on Decision Error

Decision errors do not apply to radionuclides because no statistically based sampling program was developed or required for radionuclide characterization of the Group A buildings. A 95% confidence limit was used for Resource Conservation and Recovery Act (RCRA) and Toxic Substance Control Act (TSCA) waste characterization. No modifications were made to these decision rules.

Optimization of Design

Radionuclide characterization was performed in a subjective manner to initially classify areas for waste purposes. Radionuclide sampling and analysis were not optimized to include pre-demolition survey criteria based on the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). No modifications were made to these criteria.

3.2 Radiological Characterization

Radiological characterization was performed to understand the nature and extent of radioactive materials that may be present in Buildings 551, 662, 709, 910 and Tents 10 and 11 at the 904 Pad. Data quality objectives (DQOs) were developed to focus radiological characterization so that these facilities can be initially classified. This section discusses historical radiological data on these facilities and discusses RLC conducted. Radiological hazards and RLC data are discussed in Section 4.0. Historical and RLC radiological data are presented in Appendixes A – F. Survey/scan data are presented in Appendixes A.2.1, B.2.1, C.1.1, D.1.1, E.2.1, and F.2.1 for the six facilities, respectively. Sample data are presented in Appendixes A.2.2, C.1.2, and

D.1.2. Appendixes present documentation on sample chain-of-custody, sample locations, and laboratory results.

3.2.1 Summary of Historical Data

Historically, no routine radiological surveys were taken in Buildings 551, 662, 709 or 910. No radiological samples were taken in Buildings 551, 662, 709, 910 and Tents 10 & 11 at the 904 Pad. Routine radiological surveys were taken of Tents 10 and 11 to assure that radiological contamination was being controlled. Routine radiological surveys were reviewed for the period from 1/1/98 to 12/1/98. The survey types and results are summarized in Table 3-1. Historical radiological survey data for Tent 10 and Tent 11 are presented in Appendix E.1.1 and Appendix F.1.1, respectively. Results are compared with the surface contamination limits prescribed in DOE Order 5400.5, "Radiation Protection of the Public and the Environment."

No special (one-time) radiological surveys were taken in Buildings 551, 709, 910 and Tents 10 & 11 at the 904 Pad. Building 662 had one special survey performed on the interior contents and floor of the building on 2/3/97. Forty surface contamination surveys were taken for alpha and beta-gamma, removable and total contamination. All survey results were below the Minimum Detectable Concentration (MDC) for the survey instrument. Building 662 survey data are presented in Appendix B.1.1.

Table 3-1 Types and Results of Recent Historical Radiological Surveys (1/98 – 12/98)

	Number of Radiological Survey Points Taken per Survey Frequency		Results Below Surface Contamination Limits?	
	Weekly Surveys - Interior Floor (1)	Annual Surveys - Interior Floor (2)	Weekly Surveys - Interior Floor (1)	Annual Surveys - Interior Floor (2)
Tent 10 - 904 Pad	15	19	YES	YES
Tent 11 - 904 Pad	15	15	YES	YES

(1) - Only removable, alpha and beta-gamma surveys were performed at each location.
(2) - Both total and removable, alpha and beta-gamma surveys were performed at each location.

3.2.2 Reconnaissance Level Characterization

Radiological conditions were evaluated in Buildings 551, 662, 709, and 910 and Tents 10 and 11 through the use of radiological surveys, scans and samples. Direct radiological surveys were performed on the interior and exterior of all buildings for removable and total, gross alpha and beta-gamma contamination. Scan surveys were

also performed on the interior of buildings for gross alpha and beta-gamma contamination. Radiological samples were taken on the interior/exterior of buildings.

Assessment of Radiological Surveys/Scans

Radiological survey and scan results were evaluated with respect to the potential for contamination being present. Survey and scan results were examined to determine if the data exceeded limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. An initial waste classification was then made based on the radiological posting for the areas and the results of this assessment. In addition to the survey/scan data, the following assumptions were made when determining waste volume estimates:

1. All areas and their contents that are not radiologically posted or posted as Radiological Buffer Areas or Radioactive Material Areas are considered sanitary waste or free-releasable.
2. All areas and their contents that are radiologically posted as a Contamination Area or Fixed Contamination Area are considered LLW.
3. All areas and their contents that are radiologically posted as a High Contamination Area or Airborne Radioactivity Area are considered LLW or TRU waste.

Assessment of Radiological Samples

Radiological sample results from painted surfaces were evaluated with respect to the potential for contamination being present in the area. All paint samples were obtained from locations suspected of being contaminated (i.e., biased locations). Sample results were examined to determine if data exceeded limits prescribed in DOE 5400.5. Cooling tower basin sediment samples were taken from the same general area based on the assumption that sediment concentrations are uniform throughout the basin. These results were examined to determine if data exceeded background limits (mean plus two standard deviations) in 3-PRO-140-RSP-09.03, Unrestricted Release of Bulk or Volume Material. If data are below, then the presence of radioactive contamination is not indicated. If data exceed the background limits, then radioactive material is present.

An initial waste classification for the specific media sampled was made based upon the sample results and the following assumptions:

1. All paint that contains radioactive material below the free-release limits in DOE Order 5400.5 and the RFETS Radiological Control Manual is considered sanitary waste.
2. All paint that contains radioactive material above the free-release limits in DOE Order 5400.5 and the RFETS Radiological Control Manual is considered LLW.
3. All "cooling tower" sediment that contains radioactive material within the background range of sediments, subsurface soils and surface soils is considered sanitary waste.
4. All "cooling tower" sediment that contains radioactive material above the background range of sediments, subsurface soils or surface soils is considered LLW.

3.2.3 Sampling and Field Measurement Methods, Procedures and Equipment

Radiological surveys, scans and samples were taken per the requirements of the *RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0* dated March, 1999. All radiological surveys and scans were taken in accordance with the requirements in procedure 3-PRO-165-RSP-07.02, "Contamination Monitoring Requirements." All radiological samples were taken in accordance with Analytical Services Division (ASD) requirements.

3.2.4 Laboratory Analysis

Radiological samples were analyzed per the requirements of the *RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0* dated March, 1999. All radiological samples were analyzed in accordance with ASD requirements.

3.3 Chemical Characterization

Chemical characterization was performed to determine the nature and extent of chemical contamination that may be present in the Group A facilities. Characterization was based on a review of historical and process knowledge, historical data, and RLC data. This section discusses the historical data on these facilities and RLC activities undertaken. All characterization data and related hazards are discussed in Section 4.0. Historical and RLC data are presented in Appendixes A – G.

3.3.1 Summary of Historical Data

Limited historical data exist on chemical contamination of Site buildings. The RFETS Historical Release Report discusses past building operations and releases to the environment. This document and discussions with building personnel on historical and process knowledge were used to identify potential chemicals and areas of concern. The following contaminants were considered:

- lead and other RCRA metals;
- volatile and semi-volatile organic compounds (VOCs/SVOCs);
- beryllium;
- PCBs; and
- asbestos.

Paints in some buildings were previously evaluated for RCRA metals, and some buildings were sampled to identify asbestos-containing material (ACM). All older transformers were also previously tested for PCB-containing oils. In addition, most buildings where beryllium was used or stored in the past have been assessed for industrial hygiene purposes. Data on Group A facilities from these previous assessments are summarized below and in Table 3-2.

Table 3-2 Summary of Historical Data

Building	Above release limit?				
	Pb/Metals	VOC/SVOC	Beryllium	PCBs	Asbestos
551	Below (paint)[2]	Indeterminate	Indeterminate	Indeterminate[1]	***Above***
662	Indeterminate	Indeterminate	Indeterminate	Indeterminate[1]	Indeterminate
709	Indeterminate	Indeterminate	Indeterminate	Indeterminate	Indeterminate
910	Below (paint)[2]	Indeterminate	Indeterminate	Indeterminate[1]	***Above***
Tent 10 + Permacon	Indeterminate	Indeterminate	***Above (Permacon only)***	Indeterminate	Indeterminate
Tent 11 + Permacon	Indeterminate	Indeterminate	Below	Indeterminate	Indeterminate

1 Some PCB-containing ballasts exist in the lighting systems of buildings that contain fluorescent lights.

2 Debris containing Pb/metals in paint may be managed as non-hazardous (solid) waste as long as it is not scabbled or otherwise made to constitute a separate waste stream.

3.3.1.1 Lead (Pb) and Other Metals in Paint

Analyses for Pb and other metals in paint were performed on Building 551 in 1998 and Building 910 in 1997. Ten paint samples in Building 551 and 11 paint samples in Building 910 were taken from walls, floors, tanks, and other surfaces, and subjected to the Toxicity Characteristic Leaching Procedure (TCLP) and total metals analysis. These results show lead and other RCRA metals in paint in these buildings (refer to Table 4-6 and Table 4-18).

3.3.1.2 PCBs

Transformer T556 exists on a concrete pad 20 feet east of Building 551, and is known to have leaked oil containing PCBs directly onto the soil beneath it. It was retro-filled in 1987, and continues to leak. However, analysis of the soil in 1991 showed no significant contamination (*Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs): Preliminary Assessments/ Site Description*, EG&G).

3.3.1.3 Beryllium in the 904 Pad Tents

Historical data suggest that beryllium may be present in pondcrete and saltcrete, and these wastes were handled and stored in the Pad 904 Tents and associated Permacons. RFETS has determined through process knowledge that beryllium associated with these wastes is not the chemical process powder form and therefore does not fit the criteria for a P015 RCRA listed waste. The RFETS List of Known Beryllium Areas listed the 904 Pad tents. The RFETS Chronic Beryllium Disease Prevention Program (CBDPP) has extensively sampled Tents 7 through 11 and the Permacons in Tents 10 and 11. All smear results were below the detection limit ($0.1\mu g/100\ cm^2$).

3.3.1.4 Asbestos in Buildings 551 and 910

Asbestos inspection and sampling were previously carried out on two Group A buildings. Building 551 was characterized by SITEX in 1996 and by RFETS in 1998, and results are summarized in SITEX *Asbestos Inspection and Operations and Maintenance Plan for Building 551*, Project No. 108230, and in RF/RMRS-98-272.UN, *Asbestos, Polychlorinated Biphenyls, and Paint Characterization Report, Building 551*, respectively. Bldg. 910 was characterized in 1997, and results are summarized in RF/RMRS-97-035, *Asbestos and Lead Characterization Report, Building 910 and Tank 215-D*. Additional sampling of roof material was required for both buildings.

3.3.2 Reconnaissance Level Characterization

Historical data and process knowledge for each of the facilities were reviewed based upon the following potential contaminants of concern: metals, volatile and semi-volatile organic chemicals, beryllium, PCBs, and asbestos. RLC data were collected only in those instances in which data gaps were identified.

Since a chromium-based fungicide was suspected of being used in the Building 709 Cooling Tower, wood slats and sludge were sampled for metals. The potential for beryllium contamination exists in areas used for storage and in units that processed solar pond water, so beryllium sampling was conducted in Buildings 551 and Bldg. 910, respectively. Finally, several buildings contain suspected asbestos-containing material, and were inspected and sampled accordingly.

3.3.2.1 Metals

Historical data and process knowledge indicate the use of a hexavalent chromium-containing fungicide/algicide in the Building 709 cooling tower. Also, some of the wooden slats and beams in the tower are greenish-tinted, arsenical-treated ("wolmanized") wood, which contains chromium due to the wood treatment process. Solid waste that consists of discarded arsenical-treated wood or wood products and that exceeds the TCLP threshold for RCRA hazardous waste codes D004 through D017 is not considered hazardous waste, per 40 CFR 261.4(b)(9). However, because not all of the wood in the tower is arsenical-treated wood, it was important to assess whether or not a significant amount of chromium (i.e., above the maximum concentration for toxicity characteristic pursuant to 40 CFR 261.24) is present from fungicide/algicide use in non-treated wood, which would not be exempt from RCRA.

Potential contamination of the wood slats and beams within this structure was examined by collecting wood chip samples from 4 separate wood beams or walls within the structure (i.e., from wolmanized and non-wolmanized wood), plus one field duplicate. Additionally, 7 samples of the sediment present in the basin at the base of the structure were collected, plus one field duplicate. All wood and sediment samples were subjected to TCLP analyses to determine content and leachability of chromium and other RCRA metals.

No further characterization for lead or other metals in paint was conducted. Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, has directed that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes and need not be analyzed pursuant to RCRA regulation unless the potentially lead-containing component is to be scabbled or otherwise comprise a separate waste stream.

Because evidence of metal spills and stains were not observed during building walkdowns, no metal sampling of surfacial media was conducted during RLC. However, process and historical knowledge indicate that process, product and/or waste releases have or may have occurred on the floor/slab in the Building 551 chemical dispensary, Building 662, Building 910, and the 904 Pad tents, and metals may have permeated into the floors/slabs. Therefore, additional characterization of floors/slabs (below the surface) will be conducted later in the decommissioning process (i.e., during in-process-characterization).

3.3.2.2 VOCs/SVOCs

Because evidence of VOCs/SVOCs spills and stains were not observed during building walkdowns, no VOC/SVOC sampling of surfacial media was conducted during RLC. However, process and historical knowledge indicate that process, product and/or waste releases have or may have occurred on the floor/slab in the Building 551 chemical dispensary, Building 662, Building 910, and the 904 Pad tents, and VOCs/SVOCs may have permeated into the floors/slabs. Therefore, additional characterization of floors/slabs (below the surface) will be conducted during in-process characterization.

3.3.2.3 Beryllium

Historical data and process knowledge indicate the use and storage of beryllium and beryllium-containing materials at various locations at RFETS. For example, pondcrete and saltcrete potentially containing beryllium from the solar ponds were stored in the 904 Pad tents. Because extensive beryllium surface smears from these tents and their associated Permacons were analyzed by the CBDPP, RLC did not take additional smears. However, because solar pond liquid was processed by equipment in Building 910 and no beryllium smears had been taken within the building, beryllium surface smears from three different locations within the building were taken and analyzed. Also, while no record of beryllium material storage has been located for Building 551, its use as a general warehouse with a chemical dispensary prompted collection of beryllium surface smears at three different locations within the building. Similarly, because of known waste releases in Building 662 and the potential for past storage of beryllium material, beryllium surface smears were collected at three different locations within Building 662.

3.3.2.4 PCBs

Based on process and historical knowledge and building walkdowns, no PCB sampling of surfacial media was conducted nor warranted during RLC. However, because transformers were repaired in the Building 662 yard and PCB spills occurred in the yard, PCBs could have been tracked into Building 662 and permeated into the floor. Therefore, additional characterization of floors/slabs (below the surface) will be conducted during in-process characterization. Also, some PCB-containing ballasts exist in the lighting systems of buildings that have fluorescent lights, and hydraulic systems in Buildings 551 and 910 may have contained PCBs, however, there is no evidence or history of any PCB leakage/release associated with Group A buildings.

There is no reason to suspect that any specialized paints or coatings associated with PCBs were applied to any of the Group A buildings. However, even if such paints or coatings were present, Environmental Waste Compliance Guidance #25, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*, has directed that applied dried paints, varnishes, waxes, or other similar coatings or sealants are acceptable for disposal (with notification) in a non-hazardous solid waste landfill as PCB Bulk Product Waste under 40 CFR 761.3 and 40 CFR 761.62 paragraph (b), and therefore, need not be sampled as long as restrictions outlined in 40 CFR 761.62 regarding their disposal are met.

3.3.2.5 Asbestos

Based on historical use of asbestos in various building materials, various asbestos sampling was conducted during RLC. Even though Buildings 551 and 910 had been previously inspected for asbestos, data gaps were identified, and additional sampling of roofing material was conducted. Building 662 is a steel structure built on a concrete slab with sheet metal siding and metal roof panels. Suspect ACM was identified and sampled on the interior of the building. Building 709 and its associated pump station and water lines were inspected and sampled. The Pad 904 Tents 10 and 11 were inspected, and samples were taken of tar at the base of each tent. All pipe insulation was fiberglass.

3.3.3 Sampling and Field Measurement Methods, Procedures, and Equipment

3.3.3.1 Chromium and Other RCRA Metals

For determination of chromium and other RCRA metal concentrations in wood slats and beams in the Building 709 Cooling Tower, wood chips were collected utilizing a drill and a spade bit as described in Section 5.1.2 of the RLCP. For determination of chromium and other RCRA metal concentrations in the Building 709 cooling tower basin sediment, sediment was collected utilizing a scoopula as described in Section 5.1.2 of the RLCP.

3.3.3.2 Beryllium

For determination of surface beryllium contamination in Buildings 551, 662, and 910, judgment samples consisting of smears of 100 cm^2 areas were taken using Whatman 41 filter papers as described in Section 5.3.2 of the RLCP.

3.3.3.3 Asbestos

For determination of asbestos in building materials, samples of materials were taken using a Wondermaker™, razor knife, or similar appropriate sampling tool as described in Section 5.5.2 of the RLCP.

3.3.4 Laboratory Analysis

3.3.4.1 Chromium and Other RCRA Metals

Samples were analyzed by EPA SW-846 Method 1311 (Toxicity Characteristic Leaching Procedure) and Method 6010B (Inductively Coupled Plasma Atomic Emission Spectroscopy).

3.3.4.2 Beryllium

Samples were analyzed by EPA SW-846 Method 3051 (Microwave-assisted Acid Digestion) and OSHA Method ID-121 (Flame Atomic Absorption Spectroscopy).

3.3.4.3 Asbestos

All bulk samples collected during RLC were analyzed utilizing EPA 600/M4-82020, December 1982 (Interim Method for the Detection of Asbestos in Bulk Insulation Samples) by an NVLAP-accredited laboratory. The laboratory participates in both the NVLAP and the AIHA Bulk Asbestos Sampling Quality Assurance Programs.

4.0 FACILITY HAZARDS

Based on facility/process knowledge, operating and spill records, and survey and analytical data collected, radiological and chemical hazards were identified and are presented below by building. Wastes, equipment and supplies will be removed prior to project initiation, and therefore, will not present any hazards.

In general, most of the radiological survey points were below the Minimum Detectable Concentration (MDC) of the instrument. Many of the survey points were above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There were a few points that were above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Many of the radiological sample results were above the MDC of the instrument.

Some buildings possess asbestos-containing materials. Also, some beryllium contamination was detected in the Tent 10 Permacon.

Physical hazards associated with the Group A facilities consist of those common to standard industrial environments and include hazards associated with energized systems, utilities, gas cylinders, trips and falls, and forklift operations. There are no unique hazards associated with the different facilities, except that the 709 cooling tower is an old, deteriorating structure. The structure is condemned, and no entry to the top is permitted. The wooden steps leading to the top of the structure are barricaded to deny access. The structure also presents a fire hazard. The other facilities have been relatively well maintained and are in good physical condition, and therefore, do not present hazards associated with building deterioration. Physical hazards are controlled by the Site Safety and Industrial Hygiene Program, which is based on OSHA regulations and standard industry practices.

4.1 Building 551

4.1.1 Radiological Hazards

Radiological survey results on the interior indicate that radiological hazards should be minimal. Survey results on the exterior indicate that a radiological hazard may exist on the roof and in roof drains. During decommissioning activities such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC.

All radiological survey results on the interior of Building 551 are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Also, the interior of Building 551 is not posted for radiological control purposes. Therefore, the contents of Building 551 and associated building materials may be considered non-contaminated. However, there were three locations on the exterior of Building 551 where the radiological survey results were elevated above the

contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. All other radiological survey results on the exterior were below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, a small portion of the exterior surface of the building is LLW, and the rest is considered non-contaminated.

Radiological sample results for paint were elevated but were below the free-release limits in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, the paint on the floors on the interior of the building can be considered non-contaminated. Pre- and post-paint sampling survey results were below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Results support the decision not to radiologically post the interior of Building 551.

Radiological Surveys

Radiological surveys were performed in Building 551 per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 7-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required by this characterization package for both removable and total, alpha and beta-gamma contamination: 1) 62 surveys on the floor and interior walls < 2 meters from the floor with an associated 1 m^2 scan survey; 2) 22 surveys on the ceiling and interior walls > 2 meters from the floor; 3) 31 surveys on equipment present on the floor and interior walls < 2 meters from the floor; 4) 31 surveys on equipment present > 2 meters from the floor; and 5) 30 surveys on exterior walls and roof of the building. Survey results are summarized in Table 4-1.

There are 86 radiological survey points for the interior floor and walls < 2 meters from the floor. The 1 m^2 scan around each survey point is below the MDC of the survey instrument. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 84 points less than the MDC of the instrument for total alpha contamination. There are nine points less than the MDC of the instrument for total beta-gamma contamination. There are four elevated total alpha survey points at 54, 90, 78 and 60 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There were 77 elevated total beta- gamma survey points ranging from 540 to 1443 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 55 combined survey points for the interior ceiling and walls > 2 meters from the floor and with interior equipment located > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as for total alpha contamination. There are 43 points less than the MDC of the instrument for total beta-gamma contamination. There are 12 elevated total beta- gamma survey points ranging from 381 to 1053 dpm/100 cm^2, which are

above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Table 4-1 Radiological Survey Results for Building 551

	Survey Points	Removable Contamination				Total Contamination			
		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Interior Floor & Walls < 2 meter (1)	86	<20	<20	<200	<200	<49	90	<313	1443
Interior Ceiling & Walls > 2 meter	55 (2)	<20	<20	<200	<200	<35	<55	<312	1053
Interior Equipment on Floor & Walls < 2 meter	33	<20	<20	<200	<200	<60	<60	<313	1038
Interior Equipment > 2 meter high	55 (2)	<20	<20	<200	<200	<35	<55	<312	1053
Exterior Walls and Roof	30	<20	<20	<200	<200	<43	228	<311	1071

(1) - Both total and removable, alpha and beta-gamma surveys were performed at each location covering a $1m^2$ area.
(2) - 55 total surveys were taken > 2 meters high. See survey results for details.

There are 33 survey points for the interior equipment on floors and walls < 2 meters from the floor. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as for total alpha contamination. There are 24 points less than the MDC of the instrument for total beta-gamma contamination. There are nine elevated total beta- gamma survey points ranging from 372 to 1038 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 30 radiological survey points for the exterior walls and roof. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 25 points less than the MDC of the instrument for total alpha contamination. There are 10 points less than the MDC of the instrument for total beta-gamma contamination. There are two elevated total alpha survey points at 60 and 66 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are three elevated total alpha survey points at 102, 156 and 228 dpm/100 cm^2, which are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The three elevated total alpha survey points were re-surveyed and confirmed to be above the free-release criteria. There are twenty elevated total beta- gamma survey points ranging from 453 to 1071 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Radiological Samples

Radiological samples were taken in Building 551 per the requirements of the *RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0* dated March, 1999. Ten biased paint samples were required on the floor. Pre- and post-sampling radiological surveys were taken in the areas where the paint samples were taken for both removable and total, alpha and beta-gamma contamination. Table 4-2 presents the results of the radiological samples taken in the sampling areas. Table 4-3 presents the results of the pre- and post-sampling surveys performed in the sampling areas.

Table 4-2 Radiological Sample Results for Building 551

Sample ID	Isotopic Sample Results									
	U-233/234		U-235		U-238		Pu-239/240		Am-241	
	Activity (pCi/g)	Result > MDA?	Activity (pCi/g)	Result > MDA?	Activity (pCi/g)	Result > MDA?	Activity (pCi/g)	Result > MDA?	Activity (pCi/g)	Result > MDA?
001.002	0.282	Yes	0.037	No	0.504	Yes	0.231	Yes	0.086	No
002.002	0.149	Yes	0.000	No	0.350	Yes	0.024	No	0.048	No
003.002	0.138	Yes	-0.006	No	0.267	Yes	0.129	Yes	0.085	No
004.002	1.27	Yes	0.030	No	2.01	Yes	0.103	Yes	0.076	No
005.002	0.286	Yes	0.019	No	0.312	Yes	0.010	No	-0.005	No
006.002	0.313	Yes	-0.006	No	0.374	Yes	0.033	No	0.060	No
007.002	0.936	Yes	0.049	Yes	0.856	Yes	0.036	Yes	-0.004	No
008.002	0.261	Yes	0.000	No	0.397	Yes	0.053	No	0.063	Yes
009.002	0.459	Yes	0.042	No	0.602	Yes	0.014	No	0.111	Yes
010.002	0.212	Yes	0.000	No	0.170	Yes	0.022	No	-0.006	No

Table 4-3 Radiological Survey Results for Building 551, Pre- and Post-Sampling Surveys

	Survey Points	Removable Contamination				Total Contamination			
		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Paint Sample - Pre Survey	10	<20	<20	<200	<200	<49	<49	660	1443
Paint Sample - Post Survey	10	<20	<20	<200	<200	<55	<55	<324	1674

Ten biased floor samples were taken. All 10 sample results are greater than the MDC of the counting instrument for U-233/234 and U-238. One sample result is greater than the MDC of the counting instrument for U-235. Four sample results are greater than the MDC of the counting instrument for Pu-239. Two sample results are greater than the MDC of the counting instrument for Am-241. A conversion of the radiochemistry results from pCi/g to dpm/100 cm^2 yields results approximately one order of magnitude less than free-release limits (DOE Order 5400.5 and the RFETS Radiological Control Manual) and indicate that paints within Building 551 are not radiologically contaminated (refer to Table 4-4).

4.3.2.4 PCBs

Based upon historical data, process knowledge, and personnel interviews, there is no reasonable likelihood for PCBs to be present, therefore no sampling and analysis was conducted.

4.3.2.5 Asbestos

No suspect ACM was present on the Building 709 structure. However, adjacent to the structure are several large insulated water lines and a pump station with insulated pipelines. Samples were collected from the thermal systems insulation (TSI) on the pipelines, and 3 of 5 of these samples had positive detections for asbestos. All TSI should be considered asbestos-containing. The total estimated volume of ACM is approximately 30 linear ft of asbestos-containing TSI.

4.4 Building 910

4.4.1 Radiological Hazards

Radiological survey results on the interior and exterior indicate that radiological hazards should be minimal because no survey or sample results exceeded free-release limits. During decommissioning activities such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC. Some equipment (treatment systems and tanks), associated piping, and waste lines may contain low levels of radioactivity based on liquids processed and/or conveyed (refer to Section 2.4). Therefore, controls will need to be established to prevent any releases of radioactive material during decommissioning, and surveys will need to be performed to ensure that no contamination has occurred during decommissioning. If contamination occurs, decontamination will need to be performed, and additional characterization will need to be performed to verify that no contamination remains.

Radiological sample results for paint were below the free-release limits in DOE Order 5400.5 and the RFETS Radiological Control Manual. Pre- and post- paint sampling survey results also were below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, floors can be managed as free-releasable property or sanitary waste. However, as indicated above, surveys will need to be conducted to ensure that free-release limits are still met after decommissioning.

Radiological Surveys

Radiological surveys were performed on Building 910 per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required by this characterization package for both removable and total, alpha and beta-gamma contamination: 1) 60 surveys on the floor and interior

walls < 2 meters from the floor with an associated 1 m^2 scan survey; 2) 20 surveys on the ceiling and interior walls > 2 meters from the floor; 3) 30 surveys on equipment present on the floor and interior walls < 2 meters from the floor; 4) 30 surveys on equipment present > 2 meters from the floor; and 5) 30 surveys on exterior walls and roof of the building. Survey results are summarized in Table 4-14.

There are 60 radiological survey points on the interior floor and walls < 2 meters from the floor. The 1 m^2 scan around each survey point is below the MDC of the survey instrument. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as for total alpha contamination. There are three points less than the MDC of the instrument for total beta-gamma contamination. There are 57 elevated total beta-gamma survey points ranging from 378 to 1278 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Table 4-14 Radiological Survey Results for Building 910

	Survey Points	Removable Contamination				Total Contamination			
		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Interior Floor & Walls < 2 meter (1)	60	<20	<20	<200	<200	<59	<60	<323	1278
Interior Ceiling, Walls & Equipment > 2 meter	50	<20	<20	<200	<200	<43	90	<307	1047
Interior Equipment on Floor & Walls < 2 meter	15	<20	<20	<200	<200	<59	66	<323	<323
Exterior Walls and Roof	30	<20	<20	<200	<200	<34	90	<303	1101

(1) - Both total and removable, alpha and beta-gamma surveys were performed at each location covering a 1m^2 area .

There are 50 combined survey points for the interior ceiling and walls > 2 meters from the floor and with interior equipment located > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There were 43 points less than the MDC of the instrument for total alpha contamination. There are 25 points less than the MDC of the instrument for total beta-gamma contamination. There are seven elevated total alpha survey points ranging from 48 to 90 dpm/100 cm^2, which are above the MDC of the instrument but below the

contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 25 elevated total beta-gamma survey points ranging from 366 to 1047 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 15 radiological survey points on the interior equipment on floor and walls < 2 meters from the floor. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as for total beta-gamma contamination. There are 14 points less than the MDC of the instrument for total alpha contamination. There is one elevated total alpha survey point at 66 dpm/100 cm^2, which is above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 30 radiological survey points for the exterior walls and roof. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 17 points less than the MDC of the instrument for total alpha contamination. There are eight points less than the MDC of the instrument for total beta-gamma contamination. There are 13 elevated total alpha survey points ranging from 42 to 90 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 17 elevated total beta- gamma survey points ranging from 477 to 1101 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Radiological Samples

Radiological samples were taken in Building 910 per the requirements of the *RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0* dated March, 1999. Thirty paint samples in total were required on and in the building. Ten paint samples were taken outside the building, and 20 paint samples were taken on the interior floors. Pre- and post-sampling surveys were taken in the areas where the paint samples were taken for both removable and total, alpha and beta-gamma contamination. Table 4-15 presents the results of the radiological samples taken in the sampling areas. Table 4-16 presents the results of the pre- and post-sampling surveys performed in the sampling areas.

Table 4-15 Radiological Sample Results for Building 910

Sample ID	Isotopic Sample Results									
	U-233/234		U-235		U-238		Pu-239/240		Am-241	
	Activity (pCi/g)	Result > MDA?	Activity (pCi/g)	Result > MDA?	Activity (pCi/g)	Result > MDA?	Activity (pCi/g)	Result > MDA?	Activity (pCi/g)	Result > MDA?
001.002	0.606	Yes	0.018	No	0.651	Yes	0.780	Yes	0.266	Yes
002.002	0.640	Yes	0.056	Yes	0.517	Yes	0.125	Yes	0.107	No
003.002	0.495	Yes	0.017	No	0.480	Yes	0.047	Yes	0.041	No
004.002	0.669	Yes	0.019	No	0.870	Yes	0.053	Yes	0.185	Yes
005.002	0.735	Yes	0.009	No	0.727	Yes	0.054	Yes	0.100	No
006.002	0.875	Yes	0.046	Yes	1.06	Yes	0.020	No	0.034	No
007.002	0.513	Yes	0.047	Yes	0.486	Yes	0.080	Yes	0.080	No
008.002	0.475	Yes	0.029	No	0.520	Yes	0.078	No	0.240	Yes
009.002	0.731	Yes	0.000	No	0.864	Yes	0.024	No	0.123	Yes
010.002	0.415	Yes	0.016	No	0.546	Yes	0.053	No	0.073	No
011.002	0.178	Yes	0.048	Yes	0.438	Yes	0.157	Yes	0.527	Yes
012.002	0.179	Yes	0.000	No	0.083	Yes	0.190	Yes	0.097	No
013.002	0.120	Yes	0.015	No	0.099	Yes	0.207	Yes	0.043	No
014.002	0.282	Yes	0.020	No	0.271	Yes	0.014	No	0.008	No
015.002	0.381	Yes	0.016	No	0.294	Yes	0.100	Yes	-0.033	No
016.002	0.390	Yes	0.000	No	0.624	Yes	0.247	Yes	-0.045	No
017.002	0.205	Yes	0.016	No	0.126	Yes	0.170	Yes	0.210	Yes
018.002	0.229	Yes	0.047	Yes	0.139	Yes	0.042	No	0.140	No
019.002	0.164	Yes	0.017	No	0.212	Yes	0.035	No	0.030	No
020.002	0.166	Yes	0.000	No	0.250	Yes	0.543	Yes	0.490	Yes
021.002	0.414	Yes	0.019	No	0.278	Yes	0.000	No	0.028	No
022.002	0.171	Yes	0.017	No	0.197	Yes	0.272	Yes	-0.038	No
023.002	0.134	Yes	0.000	No	0.401	Yes	-0.013	No	0.074	No
024.002	0.047	No	0.016	No	0.091	Yes	0.199	Yes	0.004	No
025.002	0.188	Yes	0.000	No	0.138	Yes	0.010	No	0.074	No
026.002	0.214	Yes	0.000	No	0.184	Yes	0.071	Yes	0.045	No
027.002	0.242	Yes	0.016	No	0.150	Yes	0.054	No	-0.021	No
028.002	0.099	Yes	0.000	No	0.098	Yes	0.019	No	-0.013	No
029.002	0.148	Yes	0.066	Yes	0.147	Yes	0.021	No	-0.033	No
030.002	0.151	Yes	0.000	No	0.071	Yes	0.144	Yes	0.090	No

Table 4-16 Radiological Survey Results for Building 910, Pre- and Post-Sampling Surveys

	Survey Points	Removable Contamination				Total Contamination			
		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Paint Sample - Pre Survey	30	<20	<20	<200	<200	<49	78	327	1167
Paint Sample - Post Survey	30	<20	<20	<200	<200	<52	<67	<315	671

The results for these paint samples indicate that all 30 sample results exceed the MDC of the counting instrument for U-238. Twenty nine sample results exceed the MDC of the counting instrument for U-233/234. Six sample results exceed the MDC of the counting instrument for U-235. Seventeen sample results exceed the MDC of the counting instrument for Pu-239/240. Seven sample results exceed the MDC of the counting instrument for Am-241. A conversion of the radiochemistry results from pCi/g to dpm/100 cm^2 yields results approximately one order of magnitude less than free-

release limits (DOE Order 5400.5 and the RFETS Radiological Control Manual) and indicates that paints within Building 910 are not radiologically contaminated (refer to Table 4-4).

There were 30 pre- and post-sampling survey points. Both removable and total, alpha and beta-gamma radiological surveys were required. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 23 points less than the MDC of the instrument for total alpha contamination for the pre-paint sampling survey. No points are less than the MDC of the instrument for total beta-gamma contamination for the pre-paint sampling survey. There are 30 points less than the MDC of the instrument for total alpha contamination. There are 18 points less than the MDC of the instrument for total beta-gamma contamination. There are seven elevated total alpha survey points ranging from 54 to 78 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 30 elevated total beta-gamma survey points for the pre-paint sampling survey ranging from 327 to 1167 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 12 elevated total beta-gamma survey points ranging from 436 to 671 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

4.4.2 Chemical Hazards

Building 910 is a chemical treatment facility that additionally contains several offices. Historical data show lead and other RCRA metals in paint, although this does not preclude disposal of the building debris as non-hazardous (solid) wastes, as long as the paint does not constitute its own waste stream (see Section 4.3.4.1). Surface smears for beryllium contamination were below present DOE free-release criteria. Historical and process knowledge gives no reason to suspect PCB contamination. Surface contamination of the floor by metals and VOCs/SVOCs was not evident during RLC building walkdowns, but contamination of the floor/slab should be considered during in-process characterization after process equipment and tanks have been removed. No signs of spills were observed, but residual contamination from any historical release could be present below the surface. In addition, releases could occur during building decommissioning (i.e., equipment and piping removal). Thermal systems insulation throughout the building was inspected and assumed to be asbestos-containing without sampling. Chemical hazards associated with Building 910 are summarized in Table 4-17.

4.4.2.1 Lead and Other RCRA Metals

Analyses for Pb in paint in Building 910 were previously conducted in 1997 and were reported in RF/RMRS-97-035, *Asbestos and Lead Characterization Report, Building 910 and Tank 215-D*. Laboratory reports are attached as Appendix D.2.1 and are summarized in Table 4-18.

Some results from TCLP analysis of paint chips are above maximum concentrations for toxicity characteristics. However, Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, directs that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes, and analysis for characteristics of hazardous waste derived from LBP is not a requirement for disposal. Therefore, LBP debris within currently identified high contamination areas and LBP removed from infrastructure by scabbling will be analyzed for toxicity characteristics (40 CFR 261.24.

Table 4-17 Summary of Building 910 Chemical Hazards

Contaminant of Concern	Analysis	Historical or RLC?	Above release limit?
Pb/Metals	TCLP and total metals in paint (future sampling suggested; see Section 4.4.2.1)	Historical	Below (*unless scabbled*; see Section 4.4.2.1)
VOC/SVOC	NA (future sampling suggested; see Section 4.4.2.2)	NA	NA
Beryllium	Surface smears	RLC	Below
PCBs	NA	NA	NA
Asbestos	Inspection; thermal systems insulation throughout the building was inspected and assumed to be asbestos-containing without sampling Roof inspection and sampling	Historical RLC	***Above*** Below.

NA = no analysis was performed.

Because no evidence of chemical spills was observed, no additional metals characterization was conducted during RLC. However, it is recommended that additional characterization of the floor/slab be conducted for metals during in-process characterization. Chemicals containing metals could have been spilled/released in the past and could be released during building decommissioning.

4.4.2.2 VOCs/SVOCs

Because no evidence of chemical spills was observed, no VOC/SVOC characterization was conducted during RLC. However, it is recommended that additional characterization of the floor/slab be conducted for VOCs/SVOCs during in-process characterization. Chemicals containing VOCs/SVOCs could have been spilled/released in the past and could be released during building decommissioning.

4.4.2.3 Beryllium

Surface smear samples were taken from interior locations not likely to be cleaned by housekeeping. One was taken on skids beneath machinery on the first floor, another was taken in the basement on the floor near a drain, and a third was taken on the surface of piping and machinery with spill stains, located on the east side of the basement. All yielded non-detect results (i.e., $\leq$ 0.1 µg/100 cm^2). The DOE free-release criterion is 0.2 µg/100 cm^2. Laboratory data from these analyses and a map of sample coordinates are included as Appendix D.3.1.4 and D.3.1.2, respectively.

Table 4-18 Metals in Paint from Building 910

Paint Type	Location	Sample ID, Total Metals	Total Metals Detectable by ICP	Sample ID, TCLP Metals	Metals with TCLP results above max. conc. for toxicity characteristics
Blue over red primer	Basement, N central, NDT tank 1523, W side, 3 locations on tank post and base	98A1506-001	Ba, Cr, Pb	X-98A1506-001	None
Tan over red primer	Metal, basement, E central, NDT tank 1535, S side, 3 locations on tank, post, and base	98A1506-002	Cr, Pb	X-98A1506-002	Cr (exceeds LDRs for Tl and Zn)
Green over red primer	Metal, basement, S central, NDT tank 1531, W side, 3 locations on tank, post, and base	98A1506-003	Pb	X-98A1506-003	None
Grey over red primer	Metal, basement, NW, NDT tank 1524 stanchion, far S post	98A1506-004	Cr, Pb	X-98A1506-004	Cr (exceeds LDRs for Tl and Zn)
Yellow over red primer	Metal, W basement stairs, S side at base	98A1506-005	Cr, Pb	X-98A1506-005	Pb (exceeds LDR for Tl)
Gray	Concrete basement floor	98A1506-006	Ba	X-98A1506-006	None
White	Concrete basement wall, W wall, 15' N of SW corner, 4' from floor	98A1506-007	None	X-98A1506-007	None
Off-white	Exterior cinder block, S wall, 15' E of SW corner, 4' from ground	98A1506-008	None	X-98A1506-008	None
Brown-red	Sheet metal, exterior of Gen 3, S side of 910, 2' W of SE corner, 4' from base	98A1506-009	Cr, Pb	ND	ND

Paint Type	Location	Sample ID, Total Metals	Total Metals Detectable by ICP	Sample ID, TCLP Metals	Metals with TCLP results above max. conc. for toxicity characteristics
White, textured	On foam insulation, Tank 215D, W of 910, E side at base	98A1506-010	Hg (by cold vapor AA)	X-98A1506-010	None
White, textured	On foam insulation, Tank 215D, W of 910, E side at base	98A1506-011 (duplicate of 98A1506-010)	None	X-98A1506-011 (duplicate of X-98A1506-010)	None

As = arsenic, Ba = barium, Cd = cadmium, Cr = chromium, Pb = lead, Hg = mercury, Se = selenium, Ag = silver, other = metals not listed in 40 CFR 261.24, ND = none detected.

4.4.2.4 PCBs

Based upon historical data, process knowledge, and personnel interviews, there is no reasonable likelihood for PCBs to be present, so no sampling and analysis was conducted.

4.4.2.5 Asbestos

Asbestos inspection and sampling were performed on Building 910 in a 1997 inspection (RF/RMRS-97-035, *Asbestos and Lead Characterization Report, Building 910 and Tank 215-D*) and as part of this RLC. Results are summarized in Table 4-19. The total estimated volume of ACM is approximately 700 linear ft of asbestos-containing TSI.

Table 4-19 Asbestos Inspection Data from Building 910

Description and Location	Asbestos Analysis Result
From 1997 inspection (RF/RMRS-97-035, *Asbestos and Lead Characterization Report, Building 910 and Tank 215-D*):	
700 linear feet of vapor barrier mastic coating on the thermal systems insulation on pipes associated with the steam heating system	Assumed to be asbestos-containing and not sampled; EPA/AHERA hazard assessment category "Thermal systems insulation in good condition," September, 1998
Drywall, tape, and joint compound; from N wall of Room 102, 3 locations	No asbestos
Mudded joints, end caps, and tank insulation, 7 locations	No asbestos
Floor filler and carpet adhesive under carpeting in Room 102	No asbestos
Tan brushed textured skim, surface of	No asbestos

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Description and Location	Asbestos Analysis Result
exterior wall cinderblock, 5 locations, including penetration into cinderblock to determine presence of loose filler	
Rubberized wall / pipe penetration filler	No asbestos
Foam tank insulation and textured coating on exterior of Tank 215-D	No asbestos
From RLC inspection:	
Roof material: East end, center	No asbestos
Roof material: Center of roof	No asbestos
Roof material: West end, center	No asbestos

4.5 904 Pad - Tent 10

4.5.1 Radiological Hazards

Radiological survey results on the interior and exterior indicate that radiological hazards should be minimal because survey and sample results do not exceed free-release limits. During decommissioning activities such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC. In addition, surveys will be needed to determine if on-going operations have created any additional hazards.

No radiological samples were required for the 904 Pad - Tent 10.

Radiological Surveys

Radiological surveys were performed on the 904 Pad - Tent 10 per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required by this characterization package for both removable and total, alpha and beta-gamma contamination: 1) 30 surveys on the floor and interior walls < 2 meters from the floor with an associated 1 m^2 scan survey; 2) 10 surveys on the ceiling and interior walls > 2 meters from the floor; 3) 30 surveys on equipment present > 2 meters from the floor; and 4) 30 surveys on exterior walls and top of the tent. Survey results are summarized in Table 4-20.

Table 4-20 Radiological Survey Results for 904 Pad - Tent 10

	Survey Points	Removable Contamination				Total Contamination			
		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Interior Floor & Walls < 2 meter (1)	30	<20	78	<200	<200	<63	600	<300	1641
Interior Ceiling & Walls > 2 meter	11	<20	<20	<200	<200	<51	<51	<306	<306
Interior Equipment > 2 meter high	33	<20	<20	<200	<200	<51	<51	<306	<306
Exterior Walls and Roof	30	<20	<20	<200	<200	<43	78	<321	486

(1) - Both Total and removable, alpha and beta-gamma surveys were performed at each location covering a $1m^2$ area .

There are 30 radiological survey points for the interior asphalt floor and tent walls < 2 meters from the floor. The 1 m^2 scan around each survey point is below the MDC of the survey instrument. All survey points are less than the MDC of the instrument for removable beta-gamma contamination. There are 29 points less than the MDC of the instrument for removable alpha contamination. There is one elevated removable alpha survey reading at 78 dpm/100 cm^2, which is above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 29 points less than the MDC of the instrument for total alpha contamination. There is one elevated total alpha survey reading at 600 dpm/100 cm^2, which is above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are nine points less than the MDC of the instrument for total beta-gamma contamination. There are 21 elevated total beta- gamma survey points ranging from 360 to 1641 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

The elevated removable and total alpha survey data points (same location) were re-surveyed, and results were below contamination limits and MDC. Therefore, the survey results indicate no radiological contamination.

There are 11 radiological survey points for the interior ceiling and walls > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable and total, alpha and beta-gamma contamination.

There are 33 radiological survey points for the interior equipment > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable and total, alpha and beta-gamma contamination.

There are 30 radiological survey points for the exterior walls and roof. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 24 points less than the MDC of the instrument for total alpha contamination. There are six elevated total alpha survey points ranging from 48 to 78 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 29 points less than the MDC of the instrument for total beta-gamma contamination. There was one elevated total beta-gamma survey point of 486 dpm/100 cm^2, which is above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

4.5.2 Chemical Hazards

The 904 Pad Tent 10 was used as a storage area for pondcrete and saltcrete. It contains a Permacon, which is evaluated separately in Section 4.6.2. Surface smears for beryllium were conducted by the Chronic Beryllium Disease Prevention Program (CBDPP), and no beryllium was found. Historical and process knowledge gives no reason to suspect PCB contamination. An asbestos inspection revealed no ACM. Surface contamination of the floor by metals and VOCs/SVOCs was not evident during RLC tent walkdowns, but contamination of the floor/slab should be considered during in-process characterization after equipment and materials have been removed. No signs of spills were observed, but residual contamination from historical releases of pondcrete and saltcrete on the pad could be present below the surface. In addition, future releases could occur prior to and during decommissioning. Chemical hazards associated with Tent 10 are summarized in Table 4-21.

4.5.2.1 Lead and Other RCRA Metals

Because no evidence of chemical spills was observed, no metals characterization was conducted during RLC. However, it is recommended that additional characterization of the floor/slab be conducted for metals during in-process characterization. Wastes containing metals were spilled/released in the past and could be released prior to and during decommissioning.

Any LBP debris from Tent 10 will not be considered hazardous waste. LBP may be considered hazardous waste if it is removed from the painted material.

Table 4-21 Summary of Pad 904 Tent 10 Chemical Hazards

Contaminant of Concern	Analysis	Historical or RLC?	Above release limit?
Pb/Metals	NA (future sampling suggested; see Section 4.5.2.1)	NA	NA
VOC/SVOC	NA (future sampling suggested; see Section 4.5.2.2)	NA	NA
Beryllium	Surface smears	Historical	Below
PCBs	NA	NA	NA
Asbestos	Inspection of pipe insulation and tar	RLC	Below

NA = no analysis was performed.

4.5.2.2 VOCs/SVOCs

Because no evidence of chemical spills was observed, no VOC/SVOC characterization was conducted during RLC. However, it is recommended that additional characterization of the floor/slab be conducted for VOCs/SVOCs during in-process characterization. Wastes containing VOCs/SVOCs were spilled/released in the past and could be released prior to and during decommissioning.

4.5.2.3 Beryllium

Pondcrete and saltcrete potentially containing beryllium from the RFETS solar ponds were stored in the 904 Pad tents and handled in the Tent 10 Permacon. Surface smear samples were taken from randomly selected interior locations. A total of 45 smears were taken, in addition to samples taken in the Permacon (see below, Section 4.6.2.3). All 45 smears taken in the tent yielded non-detect results (i.e., $\leq$ 0.1 µg/100 cm^2). The DOE free-release criterion is 0.2 µg/100 cm^2. Laboratory data from these analyses and a map of sample coordinates are included as Appendix E.3.1.4 and E.3.1.2, respectively.

4.5.2.4 PCBs

Based upon historical data, process knowledge, and personnel interviews, there is no reasonable likelihood for PCBs to be present, therefore no sampling and analysis was conducted.

4.5.2.5 Asbestos

Tent 10 was inspected, and a sample of the tar at the base the tent was taken. The tar was determined to be non-ACM. All pipe insulation is fiberglass.

4.6 904 Pad - Tent 10 PERMACON

4.6.1 Radiological Hazards

Radiological survey results on the interior indicate that a radiological hazard exists. During decommissioning activities such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC. In addition, surveys will be needed to determine if on-going operations have created any additional hazards.

There are four survey results on the interior of the 904 Pad - Tent 10 PERMACON that exceed the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There is one elevated removable alpha result and four elevated total alpha results. Also, the PERMACON is radiologically posted as a Contamination Area, and Tent 10 is radiologically posted as a Radioactive Materials Area. Therefore, the 904 Pad - Tent 10 PERMACON and its contents are considered LLW.

No radiological samples were required for the 904 Pad - Tent 10 PERMACON.

Radiological Surveys

Radiological surveys were performed on the 904 Pad - Tent 10 PERMACON per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required by this characterization package for both removable and total, alpha and beta-gamma contamination: 1) 30 surveys on the floor and interior walls < 2 meters from the floor with an associated 1 m^2 scan survey; 2) 10 surveys on the ceiling and interior walls > 2 meters from the floor; and 3) 30 surveys on exterior walls and the top of the structure. Survey results are summarized in Table 4-22.

Table 4-22 Radiological Survey Results for 904 Pad - Tent 10 PERMACON

	Survey Points	Removable Contamination				Total Contamination			
		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Interior Floor, Walls & Equipment < 2 meter (1)	40 (2)	<20	21	<200	<200	<63	342	<308	435
Exterior Walls and Roof	0								

(1) - Both total and removable, alpha and beta-gamma surveys were performed at each location covering a 1m^2 area .

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There are 40 combined radiological survey points for the interior floor and walls < 2 meters from the floor and interior ceiling and walls > 2 meters from the floor. The 1 m^2 scan around each survey point is below the MDC of the survey instrument. All survey points are less than the MDC of the instrument for removable beta-gamma contamination. There are 39 points less than the MDC of the instrument for removable alpha contamination. There is one elevated removable alpha survey points at 21 dpm/100 cm^2, which is above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 34 points less than the MDC of the instrument for total alpha contamination. There are two elevated total alpha survey points at 84 and 72 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are four elevated total alpha survey points at 342, 174, 234 and 186 dpm/100 cm^2, which are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 38 points less than the MDC of the instrument for total beta-gamma contamination. There are two elevated total beta-gamma survey points at 414 and 435 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Exterior surveys are not available for the Tent 10 PERMACON. Since the PERMACON structure is located in the Tent 10 structure, the survey results from Tent 10 are used to evaluate the potential radiological contamination on the exterior of the PERMACON.

4.6.2 Chemical Hazards

The 904 Pad Tent 10 Permacon was used for pondcrete and saltcrete repack operations, and is posted as a Radioactive Materials Area (RMA). Surface smears for beryllium were collected by the Chronic Beryllium Disease Prevention Program (CBDPP), and beryllium contamination was detected. RFETS has determined through process knowledge that beryllium associated with the Tent 10 Permacon is not the chemical process powder form and therefore does not fit the criteria for a P015 RCRA listed waste. Process and historical knowledge gives no reason to suspect PCB contamination. An asbestos inspection revealed no ACM. Surface contamination of the floor by metals and VOCs/SVOCs was not evident during RLC tent walkdowns, but contamination of the floor/slab should be considered during in-process characterization after equipment and materials have been removed. No signs of spills were observed, but residual contamination from historical releases of pondcrete and saltcrete on the pad could be present below the surface. In addition, future releases could occur prior to and during decommissioning. Chemical hazards associated with the Tent 10 Permacon are summarized in Table 4-23.

Table 4-4 Group A Buildings Paint/Surface Media Sample Results (dpm/100 cm^2)

LOCATION DESCRIPTION	SAMPLE LOCATION NUMBER	SITE SAMPLE ID	NUCLIDE	pCi/g	APPROXIMATE WEIGHT (g)	APPROXIMATE SURFACE AREA (in^2)	INDIVIDUAL NUCLIDE (dpm/100cm^2)	URANIUM TOTAL (dpm/100cm^2) Limit=*5000*	TRANSURANIC TOTAL (dpm/100cm^2) Limit=*100*
BLDG 551	from Table 4-2	highest values of each actinide throughout sample set	U-233/234	1.270	5.00	20	10.9		
			U-235	0.049			0.4		
			U-238	2.01			17.3	**28.6**	
			Pu-239/240	0.231			2.0		
			Am-241	0.111			1.0		**2.9**
BLDG 910	from Table 4-15	highest values of each actinide throughout sample set	U-233/234	0.875	8.00	20	7.5		
			U-235	0.066			0.6		
			U-238	1.060			9.1	**17.2**	
			Pu-239/240	0.780			6.7		
			Am-241	0.527			4.5		**11.2**

There are 10 pre- and post-sampling survey points. Both removable and total, alpha and beta-gamma radiological surveys were required. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as for total alpha contamination. There were 10 elevated total beta- gamma survey points for the pre-paint sampling survey ranging from 660 to 1443 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are two points less than the MDC of the instrument for total beta-gamma contamination for the post-paint sampling survey. There are eight elevated total beta- gamma survey points for the post-paint sampling survey ranging from 540 to 1674 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

4.1.2 Chemical Hazards

Building 551 is a warehouse that additionally contains several offices and a chemical dispensary. Historical data show lead and other RCRA metals in paint. This does not preclude disposal of the building debris as non-hazardous (solid) wastes as long as the paint does not constitute its own waste stream (see Section 4.1.2.1). Also, the slab of the chemical dispensary could be contaminated with metals and VOCs/SVOCs. Chemical spills potentially containing these contaminants occurred in the past. No evidence of spills was observed during RLC building walkdowns, and historical spills have been cleaned up. However, residual contamination could be present below the surface, and therefore, contamination of the slab should be considered during in-process characterization after all chemicals and storage cabinets and racks have been removed. In addition, spills could occur in the future, including during building decommissioning. Surface smears for beryllium contamination were below free-release criteria. A transformer outside and east of the building is known from historical data to be free of PCB contamination. A hydraulic lift within the building should be evaluated for PCBs during stripout. Past and present asbestos sampling shows a significant amount of ACM throughout the building. Chemical hazards associated with Building 551 are summarized in Table 4-5.

Table 4-5 Summary of Building 551 Chemical Hazards

Contaminant of Concern	Analysis	Historical or RLC?	Above release limit?
Pb/Metals	TCLP and total metals in paint Future sampling suggested; see Section 4.1.2.1	Historical	Below (*unless scabbled*; see Section 4.1.2.1)
VOC/SVOC	NA (future sampling suggested; see Section 4.1.2.2)	NA	NA
Beryllium	Surface smears	RLC	Below
PCBs	Transformer outside and east of bldg. (Hydraulic lift should be assessed during stripout.)	Historical NA	Below NA
Asbestos	Inspection; sampling of transite, floor tile, pipe insulation, elbows, and fittings. Sampling of south roof.	Historical RLC	Above Above

NA = no analysis was performed.

4.1.2.1 Lead and Other RCRA Metals

Analyses for Pb in paint in Building 551 were conducted in 1998. The results are summarized in Table 4-6 and were previously reported in RF/RMRS-98-272.UN, *Asbestos, Polychlorinated Biphenyls, and Paint Characterization Report, Building 551*. Laboratory reports are attached as Appendix A.3.1.3.

Only a single paint sample exhibited a level of RCRA metal above maximum concentrations for toxicity characteristics (40 CFR 261.24). This was a single sample of gray-green paint, which exhibited a TCLP mercury level of 0.415 mg/L (see Table 4-6 and Appendix A.3.1.3). However, Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*, directs that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes, and analysis for characteristics of hazardous waste derived from LBP is not a requirement for disposal. Therefore, LBP debris within currently identified HCAs and LBP removed from infrastructure by scabbling will be analyzed for toxicity characteristics (40 CFR 261.24.

Table 4-6 Metals in Paint from Building 551

Paint Type	Location	Sample ID, Total Metals	Total Metals Detectable by ICP	Sample ID, TCLP Metals	Metals with TCLP Results above Max. Conc. For Toxicity Characteristic
Dark blue	South interior wall	ND	ND	98A5236-001.007	None
Light gray	Concrete walls, SW corner office area	98A5236-002.002	As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others	98A5236-002.003	None
Light tan	Concrete walls, SW office area	98A5236-003.002	As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others	98A5236-003.003	None
Battleship gray	Floor, S half of bldg.	98A5236-004.002	As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others	98A5236-004.003	None
Gray - green	Columns, concrete walls, window panels, S half	98A5236-005.002	As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others	98A5236-005.003	Hg (No other metals exceed LDRs, 40 CFR 268.48)
Battleship gray	Floor, N half of bldg.	98A5236-006.002	As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others	98A5236-006.003	None
White	Drywall, office area	98A5236-007.002	As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others	98A5236-007.003	None
Light blue	Concrete, outside walls of restrooms and office areas	98A5236-015.002	As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others	98A5236-015.003	None
Tan-brown, textured	Exterior coating, S half of bldg	98A5236-012.002	As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others	98A5236-012.003	None
Tan-yellow	Corrugated sheet metal exterior, N half of bldg	98A5236-013.002	As, Ba, Cd, Cr, Pb, Hg, Se, Ag, others	98A5236-013.003	None

As = arsenic, Ba = barium, Cd = cadmium, Cr = chromium, Pb = lead, Hg = mercury, Se = selenium, Ag = silver, other = metals not listed in 40 CFR 261.24, ND = no sample taken.

Because no evidence of chemical spills was observed, no additional metals characterization was conducted during RLC. However, it is recommended that additional characterization of the chemical dispensary floor/slab be conducted for

metals during in-process characterization. Chemicals containing metals could have been spilled in the past and could be released prior to and during decommissioning.

4.1.2.2 VOCs/SVOCs

Because no evidence of chemical spills was observed, no VOC/SVOC characterization was conducted during RLC. However, it is recommended that additional characterization of the chemical dispensary floor/slab be conducted for VOCs/SVOCs during in-process characterization. Chemicals containing VOCs/SVOCs could have been spilled in the past and could be released prior to and during decommissioning.

4.1.2.3 Beryllium

Surface smear samples were taken from interior locations not likely to be cleaned by housekeeping. Two were taken in the chemical dispensary (one in a corner on the floor, and one from the top of a door assembly) and one from the surface of a pipe assembly on the east wall of the north warehouse area (Room 111). All yielded non-detect results (i.e., $\leq$ 0.1 µg/100 cm^2). The DOE free-release criterion is 0.2 µg/100 cm^2. Laboratory data from these analyses and a map of sample coordinates are included as Appendix A.4.1.4 and A.4.1.2, respectively.

4.1.2.4 PCBs

Transformer T556 exists on a concrete pad 20 feet east of Building 551, and is known to have leaked PCB-containing oil directly onto the soil beneath it (see Appendix A.3.2). It was retro-filled in 1987, and continues to leak. However, analysis of the soil in 1991 showed no significant contamination (*Assessment of Potential Environmental Releases of Polychlorinated Biphenyls (PCBs): Preliminary Assessments/ Site Description*, EG&G).

There is a hydraulic lift at Door 11D that may contain PCB oil. It is recommended that this unit be analyzed for PCB-containing oil during stripout.

4.1.2.5 Asbestos

Asbestos inspection and sampling were carried out on Building 551 by SITEX in 1996, and additional inspections were performed in 1998 and as part of this RLC.

The SITEX inspection report is attached as Appendix G. It revealed:

- asbestos-containing cemetitious board in the office area at the southern-most end of the building (total of 425 ft^2);
- 850 ft^2 of asbestos-containing floor tile under the carpet in Rooms 105, 105A, and 106;
- 1,116 linear ft of asbestos-containing pipe insulation throughout the structure; and
- 339 asbestos-containing pipe fittings and elbows throughout the structure.

The 1998 RFETS inspection (Appendix G) assumed the following to be asbestos-containing without sampling:

- approximately 3,500 ft^2 of cementitious board located in 22 window openings in the south half of the building;
- 200 linear ft of pipes and insulation associated with the HVAC system in the north end of the building.

Additionally, drywall, tape, and joint compound were sampled from three areas, and found NOT to be asbestos-containing:

- Room 109, NW office, SE corner, 4 ft from floor;
- Room 109, W main office, W wall, 3 ft S of NW corner, 4 ft from floor; and,
- Room 201, S wall, 20 ft E of W wall, 5 ft from floor.

Finally, during this RLC, the following was found (report attached as Appendix G):

- 1 of 4 samples from the south roof (24,000 ft^2) was asbestos-containing (10% chrysotile in the black tar); and
- All 3 flashing samples were asbestos-containing in the black tar layer. Two were 10% chrysotile, while the third was 25% chrysotile.

The total estimated volume of ACM is thus: 24,000 ft^2 roofing; 3,925 ft^2 cementitious wall; 1,316 linear ft pipe insulation; 855 ft^2 floor tile; and 334 elbows and fittings.

4.2 Building 662

4.2.1 Radiological Hazards

Radiological survey results on the interior indicate that radiological hazards should be minimal, except for the west-central portion of the floor where fixed alpha contamination was indicated. Survey results on the exterior indicate that a radiological hazard may exist on the roof perimeter. During decommissioning activities such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC.

Most radiological survey results on the interior of Building 662 are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Also, the interior of Building 662 is not posted for radiological control purposes. However, there are four locations on the exterior of Building 662 (on the roof perimeter) and a portion of the interior floor (west-central) where the radiological survey results are elevated above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. All other radiological survey results on the exterior are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Therefore, a small portion of the metal panels on the exterior of the building and a small portion of the interior floor are LLW, and the rest is considered non-contaminated.

No radiological samples were required for Building 662.

Radiological Surveys

Radiological surveys were performed on Building 662 per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required for both removable and total, alpha and beta-gamma contamination: 1) 32 surveys on the floor and interior walls < 2 meters from the floor with an associated 1 m^2 scan survey; 2) 10 surveys on the ceiling and interior walls > 2 meters from the floor; 3) 15 surveys on equipment present on the floor and interior walls < 2 meters from the floor; 4) 15 surveys on equipment present > 2 meters from the floor; and 5) 34 surveys on exterior walls and roof of the building. Survey results are summarized in Table 4-7.

Table 4-7 Radiological Survey Results for Building 662

	Survey Points	Removable Contamination				Total Contamination			
		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Interior Floor & Walls < 2 meter (1)	32	<20	<20	<200	<200	<49	288	<322	1116
Interior Ceiling & Walls > 2 meter	10	<20	<20	<200	<200	<43	<43	<316	<316
Interior Equipment on Floor & Walls < 2 meter	15	<20	<20	<200	<200	<49	<49	<322	<322
Interior Equipment > 2 meter high	15	<20	<20	<200	<200	<43	<43	<316	<316
Exterior Walls and Roof	34	<20	<20	<200	<200	<43	330	<316	<316

(1) - Both total and removable, alpha and beta-gamma surveys were performed at each location covering a 1m^2 area.

There are 32 radiological survey points for the interior floor and walls < 2 meters from the floor. The 1 m^2 scan around each survey point is below the MDC of the survey instrument. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 29 points less than the MDC of the instrument for total alpha contamination. There are 10 points less than the MDC of the instrument for total beta-gamma contamination. There is one elevated total alpha survey points at 96 dpm/100 cm^2, which is above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological

Control Manual. There are two total (fixed) alpha survey points at 126 and 288 dpm/100 cm^2 that are above the contamination limits. The two survey points were re-surveyed and confirmed above the free-release criteria. There are 22 elevated total beta-gamma survey points ranging from 342 to 1116 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 10 radiological survey points on the interior ceiling and walls > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable and total, alpha and beta-gamma contamination.

There are 15 radiological survey points for the interior equipment located on the floor and walls < 2 meters from the floor. All survey points are less than the MDC of the instrument for removable and total, alpha and beta-gamma contamination.

There are 15 radiological survey points for the interior equipment located > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable and total, alpha and beta-gamma contamination.

There are 34 radiological survey points on the exterior walls and roof. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as for total beta-gamma contamination. There are 15 points less than the MDC of the instrument for total alpha contamination. There are 15 elevated total alpha survey points ranging from 48 to 96 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are four elevated total alpha survey points at 210, 226, 232 and 330 dpm/100 cm^2, which are above the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. The four elevated total alpha survey points were re-surveyed and confirmed above the free-release criteria.

4.2.2 Chemical Hazards

Building 662 is a steel structure built on a concrete slab with sheet metal siding and metal roof panels. It is presently used by electricians as an office and equipment storage area. Because no evidence of chemical spills were observed during RLC building walkdowns, sampling and analysis for metals, VOCs/SVOCs and PCBs were not conducted during this RLC. Also, part of the floor was covered by office furniture and other equipment. However, based on the building history, it is recommended that additional characterization of the floor/slab be conducted for metals, VOCs/SVOCs and PCBs during in-process and environmental restoration characterization. In addition, chemicals could be released prior to building decommissioning. Beryllium surface samples yielded non-detect results. No asbestos-containing material was identified. Chemical hazards associated with Building 662 are summarized in Table 4-8.

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4.2.2.1 Lead and Other RCRA Metals

Because no evidence of chemical spills was observed, sampling and analysis for metals were not conducted during this RLC. Also, part of the floor was covered. However, based on the building history, it is recommended that additional characterization of the floor/slab be conducted for metals, including mercury, during in-process and environmental restoration characterization. Mercury could have been released during repair of mercury vapor lamps and switches, although no releases are known to have occurred.

Any LBP debris from Building 662 will not be considered hazardous waste. LBP may be considered hazardous waste if it is removed from the painted material.

Table 4-8 Summary of Building 662 Chemical Hazards

Contaminant of Concern	Analysis	Historical or RLC?	Above release limit?
Pb/Metals	NA (future sampling suggested; see Section 4.2.2.1)	NA	NA
VOC/SVOC	NA (future sampling suggested; see Section 4.2.2.2)	NA	NA
Beryllium	Surface smears	RLC	Below
PCBs	NA (future sampling suggested; see Section 4.2.2.4)	NA	NA
Asbestos	Inspection; sampling of floor tile, ceiling tile, and drywall.	RLC	Below

NA = no analysis was performed.

4.2.2.2 VOCs/SVOCs

Because no evidence of chemical spills was observed, sampling and analysis for VOCs/SVOCs were not conducted during this RLC. Also, part of the floor was covered. However, based on the building history, it is recommended that additional characterization of the floor/slab be conducted for VOCs/SVOCs during in-process and environmental restoration characterization.

4.2.2.3 Beryllium

Surface smear samples were taken from interior locations not likely to be cleaned by housekeeping. One was taken from the top surface of a locker on the north side of the building, one from the top of a light fixture, and a third from the top surface of a tall office partition on the south side of the building. All yielded non-detect results (i.e., $\leq$ 0.1 µg/100 cm^2). The DOE free-release criterion is 0.2 µg/100 cm^2. Laboratory data from these analyses and a map of sample coordinates are included as Appendix B.3.1.4 and B.3.1.2, respectively.

4.2.2.4 PCBs

Because no evidence of chemical spills were observed, sampling and analysis for PCBs were not conducted during RLC. However, due to PCB spill incidents in the yard and the fact that transformers were repaired in the yard, PCBs could have been tracked inside onto the floor. Therefore, it is recommended that samples be taken from the floor/slab inside the building and analyzed for PCBs during in-process characterization. The floor has been painted and parts are covered with tile.

4.2.2.5 Asbestos

No asbestos-containing material was identified. Three suspect asbestos containing materials (ACM) were sampled:

- Three samples of 12 in x 12 in white floor tile with yellow mastic were collected. No asbestos was detected.
- Three samples of 2 ft x 4 ft white ceiling tile were collected. No asbestos was detected.
- Three drywall samples were collected. No asbestos was detected.

4.3 Building 709

4.3.1 Radiological Hazards

Radiological survey results on the interior and exterior indicate that radiological hazards should be minimal. Sediment samples from the cooling tower basin show that a radiological hazard may exist because uranium results exceed background limits. During decommissioning activities, such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC. Additional characterization of the cooling tower basin will also be needed after the sediment has been removed.

All radiological survey results on the interior and exterior of Building 709 are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Also, Building 709 is not posted for radiological control purposes. Therefore, the contents of Building 709 and associated building materials may be considered non-contaminated.

Radiological sample results were elevated above the MDC of the counting instrument for U-233/234, U-235, U-238, Pu-239/240 and Am-241 in all or a portion of the basin sediment samples. Radiological sample results are above the background range for sediments, subsurface soils or surface soils for U-233/234, U-235, U-238, Pu-239/240 and Am-241 in all or a portion of the basin sediment samples. Therefore, the sediment is considered LLW. Pre-sediment sampling survey results are below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Post-sediment sampling survey results are not available due to standing water.

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Radiological Surveys

Radiological surveys were performed on Building 709 per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required by this characterization package for both removable and total, alpha and beta-gamma contamination: 1) 30 surveys on the floor and interior walls < 2 meters from the floor with an associated 1 m^2 scan survey; 2) 10 surveys on the ceiling and interior walls > 2 meters from the floor; and 3) 30 surveys on exterior walls and roof of the building. Survey results are summarized in Table 4-9.

Table 4-9 Radiological Survey Results for Building 709

	Survey Points	Removable Contamination				Total Contamination			
		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Interior Floor & Walls < 2 meter (1)	31	<20	<20	<200	<200	<49	60	<307	2055
Interior Ceiling & Walls > 2 meter	10	<20	<20	<200	<200	<59	<59	<316	<316
Exterior Walls and Roof	30	<20	<20	<200	<200	<59	<59	<316	1137

(1) - Both total and removable, alpha and beta-gamma surveys were performed at each location covering a 1m^2 area.

There are 31 radiological survey points for the interior concrete floor and walls < 2 meters from the floor. The 1 m^2 scan around each survey point is below the MDC of the survey instrument. Due to standing water in the cooling tower, the 10 pre-sampling surveys were used to satisfy this survey requirement. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 27 points less than the MDC of the instrument for total alpha contamination. There are 20 points less than the MDC of the instrument for total beta-gamma contamination. There are three elevated total alpha survey points at 54, 54 and 60 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 10 elevated total beta-gamma survey points ranging from 915 to 2055 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 10 radiological survey points for the interior ceiling and walls > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable and total, alpha and beta-gamma contamination.

There are 30 radiological survey points of the exterior walls and roof. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as for total alpha contamination. There are 25 points less than the MDC of the instrument for total beta-gamma contamination. There are five elevated total beta-gamma survey points ranging from 357 to 1137 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

Radiological Samples

Radiological samples were taken in Building 709 per the requirements of the *RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0* dated March, 1999. Six sediment samples were required from the concrete floor for radiological analysis. Pre- and post-sampling surveys were taken in the area where the sediment samples were taken for both removable and total, alpha and beta-gamma contamination. Table 4-10 presents the results of the radiological samples taken in the sampling areas. Table 4-11 presents the results of the pre- and post-sampling surveys performed in the sampling areas.

Table 4-10 Radiological Sample Results for Building 709

Sample ID	Sediment Isotopic Sample Results									
	U-233/234		U-235		U-238		Pu-239/240		Am-241	
	Activity (pCi/g)	Result > MDA?	Activity (pCi/g)	Result > MDA?	Activity (pCi/g)	Result > MDA?	Activity (pCi/g)	Result > MDA?	Activity (pCi/g)	Result > MDA?
006.003	4.99	Yes	0.219	Yes	3.96	Yes	0.151	Yes	0.167	Yes
007.003	8.13	Yes	0.345	Yes	8.24	Yes	0.260	Yes	0.118	Yes
008.003	5.14	Yes	0.218	Yes	4.16	Yes	0.055	No	0.151	Yes
009.003	4.59	Yes	0.000	No	3.24	Yes	0.177	Yes	0.079	No
010.003	4.14	Yes	0.294	Yes	3.92	Yes	0.051	Yes	0.031	No
012.003	4.38	Yes	0.145	Yes	4.20	Yes	0.101	Yes	0.113	Yes

Table 4-11 Radiological Survey Results for Building 709, Pre- and Post-Sampling Surveys

	Survey Points	Removable Contamination				Total Contamination			
		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Sediment Sample - Pre Survey	7	<20	<20	<200	<200	<49	60	<307	2055
Sediment Sample - Post Survey	0 (1)	NA	NA	NA	NA	NA	NA	NA	NA

(1) - Post surveys were not performed in the sediment sampling areas due to rain accumulation in the concrete basin. Radiological surveys taken on the concrete lip of the basin could be used as a surrogate for these surveys.

(2) – NA – not available

Some of the sediment sample results exceeded the background upper limits (mean plus two standard deviations) for sediments, subsurface soils and surface soils in 3-PRO-140-RSP-09.03, *Unrestricted Release of Bulk or Volume Material* (based on the *RFETS Geochemical Characterization Report*, 9/30/93). Even though some results are within the background range for sediments, they exceed the range for subsurface and surface soils, and therefore, indicate radiological contamination per the procedure.

For purposes of comparison, 3-PRO-140-RSP-09.03, *"Unrestricted Release of Bulk or Volume Material,"* presents the upper level of the background range of stream sediments, subsurface soils and surficial soils for U-233/234, U-235, U-238, Pu-239/240 and Am-241. For stream sediments this upper level is 3.967, 0.158, 3.461, 3.757 and 1.141 pCi/g for U-233/234, U-235, U-238, Pu-239/240 and Am-241, respectively. For subsurface soils this upper level is 2.64, 0.12, 1.49, 0.02 and 0.02 pCi/g for U-233/234, U-235, U-238, Pu-239/240 and Am-241, respectively. For surface soils this upper level is 2.253, 0.094, 2.000, 0.066 and 0.0227 pCi/g for U-233/234, U-235, U-238, Pu-239/240 and Am-241, respectively.

There are seven pre-sampling survey points for the sediment sampling. Removable and total, alpha and beta-gamma radiological surveys were required. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are four total alpha survey points that are below the MDC of the instrument. There are three elevated total alpha survey points ranging from 54 to 60 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There is one point less than the MDC of the instrument for total beta-gamma contamination. There are six elevated total beta-gamma survey points ranging from 1647 to 2055 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

4.3.2 Chemical Hazards

Building 709 is a cooling tower constructed primarily of wood. Adjacent to the building is a pump station with insulated pipelines and several large insulated water lines. It was suspected that a chromium-based anti-fungal agent was used to treat the tower periodically and that the wood could be contaminated with chromium. Also, some of the wood appeared to have been treated with an arsenic compound. However, no chromium or arsenic contamination was found above hazardous waste thresholds in wood-core samples or sediment samples from the bottom of the tower. Also, historical data and process knowledge give no reason to suspect contamination by VOCs/SVOCs, beryllium, or PCBs. The tower itself contains no ACM, but asbestos-containing insulation was found on the insulated lines leading from the pump station. Chemical hazards associated with Building 709 are summarized in Table 4-12.

Table 4-12 Summary of Bldg. 709 Chemical Hazards

Contaminant of Concern	Analysis	Historical or RLC?	Above release limit?
Pb/Metals	TCLP of wood-core samples from cooling tower slats	RLC	Below
	TCLP of sediment at base of tower	RLC	Below
VOC/SVOC	NA	NA	NA
Beryllium	NA	NA	NA
PCBs	NA	NA	NA
Asbestos	Inspection; Sampling of pipe insulation from pipes leading to pump station on exterior of tower.	RLC	***Above***

NA = no analysis was performed.

4.3.2.1 Chromium and Other RCRA Metals (Including Lead)

Potential chromium and arsenic contamination of the wood slats and beams within the Building 709 Cooling Tower was examined by collecting wood-chip samples from four separate wood beams and walls within the structure, plus one field duplicate (Appendix C.2.1). Samples from both greenish, arsenical-treated wood and wood without a noticeable green tint were collected. TCLP results for chromium ranged from 23 to 3,900 µg/L, all less than the 5,000 µg/L regulatory level in 40 CFR 261.24 (Table 4-13). A water rinsate sample of the bit used to collect the wood samples contained 140 µg/L chromium. Likewise, levels of arsenic and other RCRA metals were below regulatory limits (i.e., 5,000 µg/L for arsenic).

Potential chromium and arsenic contamination of the Building 709 cooling tower basin sediment was examined by collecting seven samples of the sediment in the basin at the base of the structure, plus one field duplicate (Appendix C.2.1). TCLP results for chromium ranged from 30 to 147 µg/L, all less than the 5,000 µg/L regulatory level given by 40 CFR 261.24 (Table 4-13). A water rinsate sample of the scoopula used to collect the sediment samples contained no detectable chromium. Likewise, levels of arsenic and other RCRA metals were below regulatory limits (i.e., 5,000 µg/L for arsenic).

Any LBP debris from the Building 709 will not be considered hazardous waste. LBP may be considered hazardous waste if it is removed from the painted material.

Table 4-13 TCLP Metal Results for Building 709 Cooling Tower

Description	Sample ID	Chromium (µg/L)	Arsenic (µg/L)
Wood chips:			
West panel wall	99A6333-001.002	3350	1840
West beam, not green tint	99A6333-002.002	23	137
East beam, green tint	99A6333-003.002	1750	1040
East panel wall	99A6333-004.002	3050	1780
Field duplicate of 99A6333-004.002	99A6333-005.002	3900	2140
Water rinsate sample of drill bit used to collect samples	99A6333-014.002	1.40	ND
Cooling tower sediment	99A6333-006.002	30	1610
"	99A6333-007.002	30.8	1930
"	99A6333-008.002	82.1	1710
"	99A6333-009.002	110	3690
"	99A6333-010.002	62.3	3130
"	99A6333-011.002	143	3700
Field duplicate of 99A6333-011.002	99A6333-013.002	147	3490
Water rinsate sample of scoop used to collect sediment samples	99A6333-015.002	ND	ND

ND = not detected

4.3.2.2 VOCs/SVOCs

Based upon historical data, process knowledge, and personnel interviews, there is no reasonable likelihood for VOCs/SVOCs to be present, therefore no sampling and analysis was conducted.

4.3.2.3 Beryllium

Based upon historical data, process knowledge, and personnel interviews, there is no reasonable likelihood for beryllium to be present, therefore no sampling and analysis was conducted.

Table 4-23 Summary of Pad 904 Tent 10 Permacon Chemical Hazards

Contaminant of Concern	Analysis	Historical or RLC?	Above release limit?
Pb/Metals	NA (future sampling suggested; see Section 4.6.2.1)	NA	NA
VOC/SVOC	NA (future sampling suggested; see Section 4.6.2.2)	NA	NA
Beryllium	Surface smears	Historical	***Above***
PCBs	NA	NA	NA
Asbestos	Inspection	RLC	Below

NA = no analysis was performed.

4.6.2.1 Lead and Other RCRA Metals

Because no evidence of chemical spills was observed, no metals characterization was conducted during RLC. However, it is recommended that additional characterization of the floor/slab be conducted for metals during in-process characterization. Wastes containing metals were spilled/released in the past and could be released prior to and during decommissioning.

Any LBP debris from the Tent 10 Permacon will not be considered hazardous waste. LBP may be considered hazardous waste if it is removed from the painted material.

4.6.2.2 VOCs/SVOCs

Because no evidence of chemical spills was observed, no VOC/SVOC characterization was conducted during RLC. However, it is recommended that characterization of the floor/slab be conducted for VOCs/SVOCs during in-process characterization. Wastes containing VOCs/SVOCs were spilled/released in the past and could be released prior to and during decommissioning.

4.6.2.3 Beryllium

Pondcrete and saltcrete potentially containing beryllium from the RFETS solar ponds were stored in the 904 Pad tents and handled in the Tent 10 Permacon. Surface smear samples were taken from randomly selected interior locations of the Permacon. A total of 17 random and two judgment samples were taken within the Permacon. A total of five samples yielded Be levels at or above the DOE free-release criterion of 0.2 $\mu g/100\ cm^2$ (Table 4-24). Laboratory data from these analyses and a map of sample coordinates are included in Appendix E.3.1.4 and E.3.1.2, respectively.

02

Table 4-24 Beryllium Surface Smear Results for 904 Pad Tent 10 Permacon

Description	Random Sample Coordinate Number	Sample ID	Beryllium (µg/100 cm^2)
Cement pump	1	904-05181999-35-001	0.1
Floor	1	904-05181999-35-002	0.1
Hopper 438-019	2	904-05181999-35-003	0.1
Floor	2	904-05181999-35-004	**0.4**
Cement pump	3	904-05181999-35-005	0.1
Floor	3	904-05181999-35-006	**0.3**
Floor	4	904-05181999-35-007	**0.2**
Floor	5	904-05181999-35-008	0.1
Floor	6	904-05181999-35-009	**0.2**
Ladder (4th rung from top)	7	904-05181999-35-010	0.1
Ladder (bottom rung)	7	904-05181999-35-011	0.1
Floor	7	904-05181999-35-012	0.1
Floor	8	904-05181999-35-013	0.1
Floor	9	904-05181999-35-014	0.1
Floor	10	904-05181999-35-015	**0.2**
Floor	11	904-05181999-35-016	0.1
Floor	12	904-05181999-35-017	0.1
Hood 2	Judgment	904-05181999-35-018	0.1
Floor (22,3)	Judgment	904-05181999-35-019	0.1
90% UCL on mean of lognormal distribution			**1.2**

An evaluation of the number of random beryllium samples acquired for industrial hygiene purposes (17) indicate that an adequate number of samples were acquired for characterization purposes, where only nine are required based on the EPA G-4 model (given a lognormal distribution of Be results; EPA, 1994). Also, based on a 90% upper confidence limit on the mean (of a lognormal distribution) at 1.2 µg/100 cm^2, the sampled items clearly exceed the industrial hygiene action level of 0.2 µg/100 cm^2, and thus, the Permacon interior and contents are categorized as beryllium contaminated within an RFETS-specific industrial hygiene context. As a result, it may be necessary to label any waste as "Beryllium Waste" or other such appropriate designation if such is required by the waste acceptance criteria of the facility at which it will be disposed.

4.6.2.4 PCBs

Based upon historical data, process knowledge, and personnel interviews, there is no reasonable likelihood for PCBs to be present, so no sampling and analysis was conducted.

4.6.2.5 Asbestos

The Tent 10 Permacon was inspected, and no potential ACM was identified.

4.7 904 Pad - Tent 11

4.7.1 Radiological Hazards

Radiological survey results on the interior and exterior indicate that radiological hazards should be minimal because no survey or sample results exceeded free-release limits. During decommissioning activities such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC. In addition, surveys will be needed to determine if on-going operations have created additional hazards.

No radiological samples were required for the 904 Pad - Tent 11.

Radiological Surveys

Radiological surveys were performed on the 904 Pad - Tent 11 per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required by this characterization package for both removable and total, alpha and beta-gamma contamination: 1) 30 surveys on the floor and interior walls < 2 meters from the floor with an associated 1 m^2 scan survey; 2) 10 surveys on the ceiling and interior walls > 2 meters from the floor; 3) 30 surveys on equipment present > 2 meters from the floor; and 4) 30 surveys on exterior walls and the top of the tent. Survey results are summarized in Table 4-25.

Table 4-25 Radiological Survey Results for 904 Pad - Tent 11

	Survey Points	Removable Contamination				Total Contamination			
		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Interior Floor & Walls < 2 meter (1)	30	<20	<20	<200	<200	<34	54	<324	1329
Interior Ceiling & Walls > 2 meter	14	<20	<20	<200	<200	<49	<49	<318	372
Interior Equipment > 2 meter high	31	<20	<20	<200	<200	<49	<49	<318	462
Exterior Walls and Roof	30	<20	<20	<200	<200	<43	90	<321	435

(1) - Both total and removable, alpha and beta-gamma surveys were performed at each location covering a $1m^2$ area.

There are 30 radiological survey points for the interior asphalt floor and tent walls < 2 meters from the floor. The 1 m^2 scan around each survey point is below the MDC of the survey instrument. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 27 points less than the MDC of the instrument for total alpha contamination. There are three elevated total alpha survey points at 42, 48 and 54 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 10 points less than the MDC of the instrument for total beta-gamma contamination. There are 20 elevated total beta-gamma survey points ranging from 780 to 1329 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 14 radiological survey points for the interior ceiling and walls > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as total alpha contamination. There are 13 points less than the MDC of the instrument for total beta-gamma contamination. There is one elevated total beta- gamma survey points at 372 dpm/100 cm^2, which is above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 31 radiological survey points for the interior equipment > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as total alpha contamination. There are 30 points less than the MDC of the instrument for total beta-gamma contamination. There is one elevated total beta- gamma survey points at 462 dpm/100 cm^2, which is above the MDC

of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 30 radiological survey points for the exterior walls and top of the tent. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination. There are 15 points less than the MDC of the instrument for total alpha contamination. There are 15 elevated total alpha survey points ranging from 48 to 84 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. There are 29 points less than the MDC of the instrument for total beta-gamma contamination. There is one elevated total beta-gamma survey point of 435 dpm/100 cm^2, which is above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

4.7.2 Chemical Hazards

The 904 Pad Tent 11 is used as a storage area for various wastes. It also contains a Permacon, which is evaluated separately in Section 4.8.2. Surface smears for beryllium were conducted by the Chronic Beryllium Disease Prevention Program (CBDPP), and no beryllium was found. Process and historical knowledge gives no reason to suspect PCB contamination. An asbestos inspection revealed no ACM. Surface contamination of the floor by metals and VOCs/SVOCs was not evident during RLC tent walkdowns, but contamination of the floor should be considered during in-process characterization after equipment and materials have been removed. No sign of spills were observed, but residual contamination from historical releases of pondcrete and saltcrete could be present below the surface. In addition, future releases could occur prior to and during decommissioning. Chemical hazards associated with Tent 11 are summarized in Table 4-26.

Table 4-26 Summary of Pad 904 Tent 11 Chemical Hazards

Contaminant of Concern	Analysis	Historical or RLC?	Above release limit?
Pb/Metals	NA (future sampling suggested; see Section 4.3.7.1)	NA	NA
VOC/SVOC	NA (future sampling suggested; see Section 4.3.7.2)	NA	NA
Beryllium	Surface smears	Historical	Below
PCBs	NA	NA	NA
Asbestos	Inspection of pipe insulation and tar	RLC	Below

NA = no analysis was performed.

4.7.2.1 Lead and Other RCRA Metals

Because no evidence of chemical spills was observed, no metals characterization was conducted during RLC. However, it is recommended that additional characterization of

the floor/slab be conducted for metals during in-process characterization. Wastes containing metals were spilled/released in the past and could be released prior to and during decommissioning.

Any LBP debris from Tent 11 will not be considered hazardous waste. LBP may be considered hazardous waste if it is removed from the painted material.

4.7.2.2 VOCs/SVOCs

Because no evidence of chemical spills was observed, no VOC/SVOC characterization was conducted during RLC. However, it is recommended that characterization of the floor/slab be conducted for VOCs/SVOCs during in-process characterization. Wastes containing VOCs/SVOCs were spilled/released in the past and could be released prior to and during decommissioning.

4.7.2.3 Beryllium

Pondcrete and saltcrete potentially containing beryllium from the RFETS solar ponds were stored in the 904 Pad tents. Surface smear samples were taken from randomly selected interior locations. A total of 50 smears were taken in Tent 11 and its associated Permacon, and all yielded non-detect results (i.e., $\leq$ 0.1 µg/100 cm^2). The DOE free-release criterion is 0.2 µg/100 cm^2. Laboratory data from these analyses and a map of sample coordinates are included in Appendix F.3.1.4 and F.3.1.2, respectively.

4.7.2.4 PCBs

Based upon historical data, process knowledge, and personnel interviews, there was no reasonable likelihood for PCBs to be present, so no sampling and analysis was conducted.

4.7.2.5 Asbestos

Tent 11 was inspected, and a sample of tar at the base the tent was taken. The tar was determined to be non-ACM. All pipe insulation is fiberglass.

4.8 904 Pad - Tent 11 PERMACON

4.8.1 Radiological Hazards

Radiological survey results on the interior indicate that radiological hazards should be minimal because no survey or sample results exceeded free-release limits. During decommissioning activities such as equipment/material strip-out, radiological surveys of equipment/material will be needed to detect any radiological hazards that may be present under equipment/material or in areas that were not accessible during RLC. In addition, surveys will be needed to determine if on-going operations have created additional hazards.

No radiological samples were required for the 904 Pad - Tent 11 PERMACON.

Radiological Surveys

Radiological surveys were performed on the 904 Pad - Tent 11 PERMACON per the requirements of the RFETS Radiological and Non-Radiological Group A (Buildings 551, 662, 709, 910 and 904 Pad Tents 8-11) Characterization Package, Revision 0 dated March, 1999. The following surveys were required by this characterization package for both removable and total, alpha and beta-gamma contamination: 1) 30 surveys on the floor and interior walls < 2 meters from the floor with an associated 1 m^2 scan survey; 2) 10 surveys on the ceiling and interior walls > 2 meters from the floor; and 3) 30 surveys on exterior walls and the top of the structure. Survey results are summarized in Table 4-27.

Table 4-27 Radiological Survey Results for 904 Pad - Tent 11 PERMACON

	Survey Points	Removable Contamination				Total Contamination			
		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Interior Floor & Walls < 2 meter (1)	30	<20	<20	<200	<200	<49	<63	<300	414
Interior Ceiling & Walls > 2 meter	15	<20	<20	<200	<200	<49	<49	<318	<318
Exterior Walls and Roof	30	<20	<20	<200	<200	<49	54	<315	<315

(1) - Both total and removable, alpha and beta-gamma surveys were performed at each location covering a 1m^2 area .

There are 30 radiological survey points for the interior floor and walls < 2 meters from the floor. The 1 m^2 scan around each survey point is below the MDC of the survey instrument. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as total alpha contamination. There are 27 points less than the MDC of the instrument for total beta-gamma contamination. There are three elevated total beta-gamma survey points ranging from 336 to 414 dpm/100 cm^2, which are above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

There are 15 radiological survey points for the interior ceiling and walls > 2 meters from the floor. All survey points are less than the MDC of the instrument for removable and total, alpha and beta-gamma contamination.

There are 30 radiological survey points for the exterior walls and top of the structure. All survey points are less than the MDC of the instrument for removable alpha and beta-gamma contamination as well as total beta-gamma contamination. There are 29 points

less than the MDC of the instrument for total alpha contamination. There is one elevated total alpha survey points at 54 dpm/100 cm^2, which is above the MDC of the instrument but below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual.

4.8.2 Chemical Hazards

The 904 Pad Tent 11 Permacon was used for pondcrete and saltcrete operations and is now being used to repack waste chemicals. Surface smears for beryllium were conducted by the Chronic Beryllium Disease Prevention Program (CBDPP), and no beryllium was found. Process and historical knowledge gives no reason to suspect PCB contamination. An asbestos inspection revealed no ACM. Surface contamination of the floor by metals and VOCs/SVOCs was not evident during RLC tent walkdowns, but contamination of the floor/slab should be considered during in-process characterization after equipment and materials have been removed. No signs of spills were observed, but residual contamination from historical releases of pondcrete and saltcrete on the pad could be present below the surface. In addition, future releases could occur prior to and during decommissioning. Chemical hazards associated with the Tent 11 Permacon are summarized in Table 4-28.

4.8.2.1 Lead and Other RCRA Metals

Because no evidence of chemical spills was observed, no metals characterization was conducted during RLC. However, it is recommended that additional characterization of the floor/slab be conducted for metals during in-process characterization. Wastes containing metals were spilled/released in the past and could be released prior to and during decommissioning.

Any LBP debris from the Tent 11 Permacon will not be considered hazardous waste. LBP may be considered hazardous waste if it is removed from the painted material.

Table 4-28 Summary of Pad 904 Tent 11 Permacon Chemical Hazards

Contaminant of Concern	Analysis	Historical or RLC?	Above release limit?
Pb/Metals	NA (future sampling suggested; see Section 4.8.2.1)	NA	NA
VOC/SVOC	NA (future sampling suggested; see Section 4.8.2.2)	NA	NA
Beryllium	Surface smears	Historical	Below
PCBs	NA	NA	NA
Asbestos	Inspection	RLC	Below

NA = no analysis was performed.

4.8.2.2 VOCs/SVOCs

Because no evidence of chemical spills was observed, no VOC/SVOC characterization was conducted during RLC. However, it is recommended that additional characterization of the floor/slab be conducted for VOCs/SVOCs during in-process characterization. Wastes containing VOCs were spilled/released in the past and could be released prior to and during decommissioning.

4.8.2.3 Beryllium

The Tent 11 Permacon was sampled as part of the analysis of Tent 11 (see Section 4.7.2.3). All smears yielded non-detect results (i.e., $\leq$ 0.1 µg/100 cm^2). The DOE free-release criterion is 0.2 µg/100 cm^2. Laboratory data from these analyses and a map of sample coordinates are included in Appendix F.3.1.4 and F.3.1.2, respectively.

4.8.2.4 PCBs

Based upon historical data, process knowledge, and personnel interviews, there is no reasonable likelihood for PCBs to be present, so no sampling and analysis was conducted.

4.8.2.5 Asbestos

The Tent 11 Permacon was inspected, and no potential ACM was identified.

5.0 DECOMMISSIONING WASTE TYPES AND VOLUME ESTIMATES

The disposition of Group A facilities will generate a large quantity of waste. The Site will be able to recycle some waste materials, such as structural metal. Most of the waste will be disposed as sanitary waste. A small amount will have to be disposed off-site as low-level radioactive or chemical (i.e., RCRA - and asbestos containing-) waste. The listing below presents an estimate, by building, of the amount of materials to be disposed. The assumption is that all of these materials will be disposed as sanitary waste. Table 5-1 presents estimates of non-sanitary waste volumes that will be generated by building. Additional characterization will be necessary to finalize volume estimates. In addition, detailed measurements and calculations will be necessary to determine precise waste volumes.

BUILDING 551

DIMENSIONS
122' x 180' x 25' south section
90' x 202' x 25' north section/addition
45' x 65' x 20' east section/addition
MATERIAL QUANTITIES (includes all three sections)
Concrete floor deck - 43,000 cu ft
Concrete roof deck – 12,000 cu ft
Concrete columns and beams - 11,000 cu ft
Concrete block - 15,000 cu ft
Exterior wall board - 1,500 cu ft
Corrugated metal - 35,000 sq ft
Translucent panels - 7,000 sq ft
Piping - 12,000 linear feet (ft) (0.5" to 6" diameter)
Structural steel - 16,000 ft
Sheet metal - 12,000 sq ft
Metal racks and shelving - 12,000 sq ft
Angle iron - 1,600 ft
Metal drawers storage - 25' x 4' x 4'
Plywood and other wood debris - 100 sq ft

BUILDING 662

DIMENSIONS
40' x 65' x 15' (eave)
MATERIAL QUANTITIES
Sheet metal - 6,000 sq ft
Insulation - 8,500 sq ft
Plywood - 500 sq ft
Dry wall and pre-fab wall material - 4,000 sq ft
Structural steel - 700 ft
Light-weight roof steel - 2,500 ft

BUILDING 910

DIMENSIONS
(1^{st} Floor) 47' x 102' x 13'

(2nd Floor) 47' x 102' x 19'

MATERIAL QUANTITIES

Concrete flooring - 10,000 cu ft
Concrete block - 5,000 cu ft
Concrete - 15,000 cu ft
Tanks - 41(15 on lower level, 24 on 1st level, and 2 outside)
Sheet metal - 200 sq ft
Structural steel - 100 ft
Lab slate bench - 30 sq ft
Piping - 3,000 ft
Room 103 - motor control center (MCC), 10' x 2' x 8'
Gas generators - 3 housed inside of metal units, 15'x10'x10'H
Cooling towers (sheet metal) - 3 outside on steel supported platform, 700 sq ft of metal

Note: Some process, product-storage, and waste tanks could be re-used, as well as the gas generators and cooling towers. The building also consists of various instrumentation, pumps, valves, gauges, and other associated process equipment that are probably re-useable.

709 COOLING TOWER (CT)

DIMENSIONS

35' x 45' x 35' HIGH

MATERIAL QUANTITIES

Wooden cooling tower - 6,000 sq ft
Corrugated metal - 2,000 sq ft
Piping - 700 ft
Steel ladder & cage bolted to side of cooling tower - 35' high
Concrete - 500 cu ft
Generator - 2,000 lbs.
Generator platform - 12'x 12' checkered plate w/1.5" railing (4 sides)

TENTS 10 & 11

DIMENSIONS

#10) 60' x 362' x 21'(high point)
#11) 60' x 334' x 21' (high point)

MATERIAL QUANTITIES

Panels – 2,000 cu ft membrane panels
Aluminum framing - 60,000 lbs
Sheet metal - 4,000 sq ft

Table 5-1 Non-Sanitary Waste Estimates for Group A Facilities

Group A Facilities	Low-Level Waste	RCRA/ Chemical Waste	Mixed Waste	PCB Waste	Asbestos Waste
B551	12,000 cu ft concrete – south side roof 15,000 sq ft corrugated metal – north side roof	None	None	None	24,000 sq ft -- roofing 3,925 sq ft -- cementitious wall 1,316 linear ft – pipe insulation 855 sq ft – floor tile 334 elbows & fittings
B662	2,000 sq ft sheet metal – roof	None	2,600 cu ft concrete-slab	None	None
B910	None	None	None	None	Unknown volume associated with piping -- TBD
709 CT	55 gal. sediment 2,000 cu ft concrete - basin	None	None	None	25 cu ft
Tent 10	Unknown volume associated with floor -- TBD	Unknown volume associated with floor -- TBD	Unknown volume associated with floor -- TBD	None	None
Tent 10 Permacon	Unknown volume associated with floor -- TBD	Unknown volume associated with floor -- TBD	Unknown volume associated with floor -- TBD	None	None
Tent 11	Unknown volume associated with floor -- TBD	Unknown volume associated with floor -- TBD	Unknown volume associated with floor -- TBD	None	None
Tents 11 Permacon	Unknown volume associated with floor -- TBD	Unknown volume associated with floor -- TBD	Unknown volume associated with floor -- TBD	None	None

6.0 DATA QUALITY ASSESSMENT

Data used in making management decisions for dispositioning structures, waste, and materials resulting from decommissioning activities must be of adequate quality to ensure 1) adequate safety of associated human health and the environment 2) compliance with waste requirements. Acceptable data quality for input into these decisions is required by applicable K-H corporate policies (e.g., K-H, 1997, §7.1.4 and 7.2.2) and DOE Order 414.1, Quality Assurance, §4.b.(2)(b). Verification and validation of the data ensure that data used in decisions resulting from the decommissioning process are usable and defensible.

This DQA consists of Verification and Validation (V&V) of data and decisions relative to the original DQOs formulated during the planning phase (Integrated Work Control Package (Type-1), Work Control # T0100346, *Site Characterization of Buildings 910, 551, 662, 709, & 904 Pad Tent Structures 7, 8, 9, 10, & 11*) and the quality requirements cited above. The DQA also includes a quantitative assessment of non-radiological data to ensure that enough samples were acquired to substantiate conclusions for decisions specific to each unique combination of building and potential non-radiological hazard. In the case of radiological data, and consistent with the purpose reconnaissance level characterization, data are not used for free-release purposes, but only to indicate waste types and preliminary strategy for pre-demolition surveys.

Table 6-1 summarizes the DQA effort, and includes over 700 individual checks performed on the data. Several qualifications were made to the data as a result of these checks and are summarized as footnotes on the table and throughout this section. All historical data provided in this report, in contrast to the most recent RLC data, are qualified as estimates only, because the same "levels" of quality control practiced for RLC cannot be verified.

6.1 Verification/Validation Of Results

Verification of the radiological survey data set(s) corroborates that data produced and used by the project are documented and traceable per quality requirements. Specifically, verification confirmed the following:

- Format and content of the data are clearly presented relative to the project decisions.
- Survey results are properly authenticated, dated, and labeled, which allows clear traceability to survey locations and responsible technical personnel.
- Calibrations and periodic performance checks of all measurement instrumentation produced satisfactory accuracy and precision.
- Count times of surveys produced adequate sensitivity of measurements for comparison with action levels.

Table 6-1 "Group A" Bldgs -- V&V Checklist

EVALUATION CRITERIA

Table 6-1 "Group A" Bldgs -- V&V Checklist

Data Sets	RMRS QAPD sec 6.4	records authenticated	records peer reviewed	errors/changes initialed/dated	data mgmt: process traceability	data mgmt: adequate archival	Chain-of-Custody	Mgmt review/approval	QA review/approval	Technical review/approval	raw data; original data forms	QA assessments/NCRs/CARs	data reduction/calculations	significant figures	D&D Char Protocol	sample quantities (adequacy of)	analytical methods & MDA/MDC	DQOs accomplished (via decisions)	background rads addressed	data quality indicators (PARCCS)	Precision adequate	Accuracy adequate	Representative (data)	Complete (data sets)	Comparable (data)	Sensitivities adequate	Bias acceptable	QC measurements	method validation	historical data	SOW (subcontracted vendors)	case narrative	EDDs	comments
Bldg 551 (Warehouse) - rad RLC	X	X	X	X	X	X	X	X	X	L			X		J	X		C	X	X	X	X	X	X	F	X	X	X	NA	X	X		
rad data - historic	X	X	X					X	X	L			X		NA														X		X		information only
chemical data - RLC	H	H	X		X	X	X	X	X	L			X		X	X	X	NA	X	M	X	X	X	X	X	X	X		NA		X		Be only
chemical data - historic						X				L								NA											X		X		Metals, PCBs
Bldg 662 (obsolete Butler) - rad RLC	X	X	X	X	X	NA	X	X	X	L			X		X	X	X	C	X	X	X	X	X	X	X	X	X	X	NA		NA		
rad data - historic	X	X	X	X	X		X	X	X				X																X				
chemical data - RLC	H	H	X		X	X	X	X	X	L			X		X	X	X	NA	X	M	X	X	X	X	X	X	X	X	NA		X		Be only
chemical data - historic																		NA															none
Bldg 709 (Cooling Towers) - rad RLC	X	N	X	X	X	X	X	X	X	L			X		K	X		C	X	X	X	X	K	X	X	X	X	X	NA		X		
rad data - historic																																	
chemical data - RLC	X	X	X		X	X	X	X	X	L			X		X	X	X	NA	X	M	X	X	X	X	X	X	X	X	NA		X		TCLP metals
chemical data - historic																		NA															
dg 910 (Solar Ponds/Water Treatment) - rad RL	X	X	X	X	X	X	X	X	X	L			X		J,L	X		C	X	X	X	X	L	X	X	X	X	X	NA		X		
rad data - historic																																	
chemical data - RLC	H	H	X		X	X	X	X	X	L			X		X	X	X	NA	X	M	X	X	X	X	X	X	X	X	NA	X	X		Be only
chemical data - historic										L								NA											X				Metals
Tent 10 (of RCRA Unit 15B) - rad RLC	X	X	X	X	X	X	X	X	X	L			X		X	X	X	C	X	X	X	X	X	X	X	X	X	X	NA		NA		
rad data - historic	X	X	X	X		NA	X	X	X	L																			X				
chemical data - RLC																		NA											NA				none
chemical data - historic	X			X		X				L	X							NA											X				Be only
Tent 11 (of RCRA Unit 15B) - rad RLC	X	X	X	X	X	X	X	X	X	L			X		X	X	X	C	X	X	X	X	X	X	X	X	X	X	NA		NA		
rad data - historic	X	X	X	X		NA	X	X	X	L			X																X				
chemical data - RLC																		NA											NA				none
chemical data - historic	X			X		X		X	X	L			X					NA											X				Be only

J unable to confirm ~30 scans for items above & below a 2m height.
F typically ≤20dpm/100 cm2 for removable surveys
NA not applicable
C only local area backgrounds were subtracted, not material backgrounds
M all results less than or equal to MDLs
qualifications to Chain-of-Custody records discussed in text

N no authentication or peer review on maps (esp. rad samples)
K unable to confirm ~30 scans for items below a 2m height.
L only 20 of 30 planned survey locations/results
H Be map not authenticated/reviewed; otherwise OK
X requirement satisfied

Validation consists of a technical review of all data that directly support the dismantling and waste management decisions, so that any limitations of the data relative to project goals are delineated, and the associated data are qualified (caveated) accordingly. Data were validated relative to the DQOs of the project as defined in the DDCP and quality requirements cited earlier in this section.

PARCC parameters address characteristics of the data that must be defined for scientific integrity and defensibility. The following subsections on PARCC parameters -- Precision, Accuracy, Representativeness, Comparability, and Completeness -- will also include discussion on bias and sensitivity.

6.1.1 Precision

Radiological Surveys/Samples

Precision of the radiological survey instrumentation is satisfactory based on daily source checks within tolerance for each individual instrument used on the project, which includes all measurement types (i.e., scans and static measures for total contamination, swipes for removable). Adequate precision was established through instrument performance within a ±20% range as defined by measurement results compared to a standard source value. Based on standard protocol (*Radiological Safety Practices*), any measurement exceeding the defined tolerance limits required corrective action (repair or replacement) prior to the instrument's use "in the field". Daily source check results are maintained by Radiological Operations in Building 549.

Precision of individual radiochemistry results for the project is indeterminate because no duplicate or replicate samples were acquired. However, precision within individual data sets (by building) is good based on the low variability of all results clustered around the required detection limits (RDLs, i.e., the contractually required minimum detectable concentrations). RDLs are 0.3 pCi/g or pCi/l for ^{239,240}Pu and ^{241}Am and 1 pCi/g or pCi/l for the U species. The low variabilities of the radiochemistry data sets, indicative of good precision, are indicated by the ranges listed below:

- Bldg. 551: ~RDL to ~1pCi/g (all actinides of interest -- ^{233,234}U, ^{235}U, ^{238}U, ^{239,240}Pu, & ^{241}Am)
- Bldg. 662: ~RDL to ~ 9 pCi/g (U species) and RDL (≤0.3 pCi/g ^{239,240}Pu & ^{241}Am)
- Bldg. 910 - ~RDL for all actinides

Laboratory precision is adequate based on acceptable results from duplicate laboratory analyses. One duplicate sample failed for the batch originating from Building 910, but the batch was consequently re-analyzed with satisfactory QC results.

Hazardous Constituents

Overall precision of (RCRA-characteristic) metals for the project is adequate based on results of the project's real/duplicate-pair below characteristic action levels for all metals of interest. Relative percent difference values (RPDs) for evaluation of precision are

irrelevant when both sets of real and duplicate values are well below action levels and/or near acceptable method detection limits, as was the case in this data set.

Precision of beryllium results is adequate based on the same rationale given for the RCRA-characteristic metals discussed above.

Asbestos

Repeatability is adequate within the data set based on all results less than action levels (≤1% asbestos); field duplicates were not collected.

6.1.2 Accuracy (And Bias)

Radiological Surveys/Samples

Accuracy of radiological surveys is satisfactory based on RFETS-programmatic annual calibrations that establish instrument efficiencies and sensitivities for all instrumentation used on this project. Daily source checks also provided periodic checks to ensure that all sensors are within accuracy tolerances during daily operations. Calibration and calibration check results are within the RFETS and industry-standard requirement of 20% of the applicable reference standard values.

Accuracy of radiochemistry results is typically within ±1 pCi/g and ±1 pCi/liter for all real samples and all actinides of interest at or near contractually required minimum detectable concentrations (i.e., 0.3 pCi/g or pCi/l for 241Am, 239,240Pu; 1 pCi/g or pCi/l for the U species). Sample-specific accuracies are reported on the laboratory reports as a function of total error, which includes counting error. Accuracy of radiochemistry results was controlled through periodic laboratory calibrations and use of lab control samples. Recoveries of laboratory control samples (LCS) ranged from 92% to 115% of a spike standard at 8 pCi/l, well within the industry standard of ±20% recovery of the reference standard value. Other quality controls, such as sample-specific yield percentages, are maintained in the original laboratory data packages managed by K-H Analytical Services Division in Building 881. Selected QC data, including those resulting from preparation blanks and LCS, are provided herein (Appendices A.2.2.4, C.1.2.4, and D.1.2.4.)

No biases were noted that would cause data to be qualified or rejected. Results from preparation blanks were at or below MDC values in units of dpm; nondetections in blanks indicate that the potential for false positives in the results due to cross-contamination of samples during laboratory processing is extremely unlikely. Finally, neither dilutions nor matrix interferences compromised accuracy of results.

Hazardous Constituents

Accuracy for (RCRA-characteristic) metals is adequate based on a variety of laboratory quality controls, including calibrations, serial dilutions (<10% difference in actual and predicted concentrations), lab control samples (%recoveries analyte-specific), and matrix spike %-recoveries within ±25% of the standard value. Blank samples yielded

nondetectable levels and thus potential cross-contamination or false positive results were not an issue. QC sample results are included with the data in Appendix C.2.1.4.

Accuracy of beryllium results is adequate for the project based on satisfactory LCS recoveries (% LCS recoveries) at 96% for the batch. Blank samples yielded nondetectable levels, and thus potential cross-contamination and false positive results are not an issue.

Asbestos

Accuracy for asbestos volumetric concentrations is based on the semi-quantitative technique of petrography via polarized light microscopy. Analysts can typically quantify components to within several percent at high concentrations ranging to ~1% at low concentrations (i.e., presence or absence of the mineral of interest). Accuracy for the project is adequate, as the contrast between 0% and 1% is an easy distinction to discern for the decision of "No ACM".

6.1.3 Representativeness

Samples and surveys are representative of the materials and locations of interest based on the following criteria:

- Familiarity with facilities -- multiple walk-downs and collaborations by and within the sampling team;
- Use of controlled and (site) approved methods including:
  - Health & Safety Practices (HSP) Procedure 18.10, "Radioactive Material Transfer and Unrestricted Release of Property and Waste," and
  - Radiological Safety Practices (RSP) Procedure 9.01, "Unrestricted Release of Property, Material, Equipment and Waste."
  - RSP 9.03, Unrestricted Release of Bulk or Volume Material," is also applicable
  - K-H Module RC01, Version B.3, *Isotopic Determinations by Alpha Spectroscopy*
  - K-H Module NR01, Version A, *Beryllium Filters* [including SW846 3051/OSHA ID-121 for Whatman filters and NIOSH 7300 for MCE filters)
  - K-H Module SS05 [including SW846 methods 1311 (TCLP), 3005A/6010A/6020B (total metals), and 7470 (Hg)];
- Compliance with the Characterization Package (RMRS, March 1999, *Characterization of Buildings 551, 662, 709, 910, & 904 Pad Tent Structures 7, 8, 9, 10, & 11*, Work Control No. T0100346, Rev. 0) -- reviewed & approved by technical and management consensus prior to implementation; and

- Analysis of samples within EPA recommended holdtimes.

6.1.4 Completeness

A comparison between sample and survey planning specifications (IWCP # T0100346, Rev. 0) with the actual numbers and locations where sample and survey data were acquired (§3 and §4) indicates that all planned surveys and samples were acquired with the following exceptions:

- ≤31 items within Bldg 551 at >2m in height -- alpha surveys;
- ≤31 items within Bldg 551 at <2m in height -- alpha surveys;
- ≤30 items within Bldg 709 at <2m in height -- alpha surveys;
- ≤30 items within Bldg 910 at <2m in height -- alpha surveys; and
- ≤30 items within Bldg 910 at <2m in height -- alpha surveys.

The absence of this data does not necessarily affect ultimate project decisions, as the purpose of radiological surveys is only to provide a general indication of radiological contamination throughout the facilities of interest, which may indirectly support free-release data at a later stage in the D&D evolution. The total number of planned surveys was determined by Radiological Engineering professional judgement and consensus approval by Quality Assurance and management organizations. Completed surveys are summarized in Tables 4-1, 4-7, 4-9, 4-14, 4-20, and 4-25.

Quality records for the data presented are complete as evidenced in the Appendices.

6.1.5 Comparability

All results presented are comparable with data of like contaminants of concerns for on a site- and DOE-complex wide basis. This comparability is based on the following:

- Use of standardized engineering units in the reporting of measurement results;
- Use of documented and approved procedures (*Radiological Safety Practices*); and
- Thorough documentation of the planning and sampling/analysis processes, and data reduction into formats designed for making decisions based on the project's original DQOs.

6.1.6 Sensitivity

Sensitivities for all surveys and chemical analyses are adequate, because all are less than or equal to DQO decision criteria. Adequate sensitivities, in units of dpm/100^2 cm, were attained for all radiological surveys based on MDAs at or below the decision limits. For RCRA-characteristic metals and radiochemical results, MDAs were consistently less than RDLs for all actinides of interest. Beryllium sensitivities were ½ the action level of 0.2 μg/$100cm^2$.

6.2 Summary

The data presented in this report have been verified and are qualified as valid and complete for comparison with applicable action levels; free-release criteria (action levels) for radiological and beryllium survey results; RCRA characteristic (hazardous) waste thresholds for TCLP metals; and ACM specifications. All data subsets (by location and analytical suite) comply with the Reconnaissance Level DQOs, which support an initial characterization of the Group A facilities.

7.0 CLASSIFICATION OF GROUP A FACILIITIES

Based on the analysis of radiological, chemical and physical hazards, the Group A Facilities were classified pursuant to the RFETS Decommissioning Program Plan (DPP, K-H, 1998a).

Classification was based on a review of historical and process knowledge, historical radiological and chemical data, and newly acquired RLC data. Results indicate the presence of some radioactive contamination and asbestos but no other significant chemical or physical hazards exist. Some beryllium contamination was also detected in the Tent 10 Permacon. Classifications by building are presented below.

FACILTIY	CLASSIFICATION
Building 551	Type 2
Building 662	Type 2
709 Cooling Tower	Type 2
Building 910	Type 2
Tent 10, 904 Pad	Type 2
Tent 11, 904 Pad	Type 2

8.0 REFERENCES

DOE/RFFO, CDPHE, EPA, 1996. Rocky Flats Cleanup Agreement (RFCA), July 19, 1996.

DOE Order 5400.5, "Radiation Protection of the Public and the Environment."

EPA, 1994. G-4

K-H, 1998a. Decommissioning Program Plan, October 8, 1998.

K-H, 1998b. Facility Disposition Program Manual, MAN-076-FDPM.

K-H, 1999a. Decontamination and Decommissioning Characterization Protocol.

K-H, 1999b. Reconnaissance Level Characterization Plan

MARSSIM – Multi-Agency Radiation Survey and Site Investigation, 12/97 (NUREG-1575, EPA 402-R-97-016).

RFETS, 1999. Environmental Waste Compliance Guidance #25, *Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition*

RFETS, 1999. Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based Paint Debris Disposal*